

# How do Greek Teachers Use Computer Technology in the Education for Students with Reading and Writing Difficulties in Primary School

*A qualitative research of teachers in Greece*

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How do Greek teachers use computers to teach students with reading and writing difficulties in Primary Education?

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## **Abstract**

According to the learning support teachers' association, almost one out of five children seems to have difficulties related to reading and dyslexia (3.3% are diagnosed with dyslexia & 15.6% with suspected dyslexia). The study that follows is an investigation on how teachers, in which way they use computer in order to teach students with reading and writing difficulties with in Greek primary school level. In order to achieve this goal, I interviewed primary school teachers who work in inclusive classrooms. Questions were focused on the teachers' practices and definitions of the terminology and what practices they did use to enrich and help students with difficulties in reading and writing. In order to understand the process in depth, a qualitative approach was used and data was analyzed by thematic analysis. Four teachers from four different schools were interviewed. The findings revealed six themes, which illustrated, except from themes, the situation of the Greek educational system and the difficulties teachers have to deal with. Data was collected via semi-structured interviews. Teachers tried their best in order to teach under difficult conditions, without following educational practices of the western world, although Greece is a country which has signed Salamanca Declaration and has approved Education as a Human Right. Teachers are well educated but the state's finance is insufficient. Teachers claimed that the best way to improve and help students with difficulties on those fields, is by implementing the curriculum with technological practices and appropriate software. Additionally, this thesis shows furthermore, teachers' suggestions of using computers during the teaching and learning process.

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Norway, who contributed to my current way of thinking. Special thanks go to my respondents for their generous support during data collection.

## **List of Abbreviations**

**ΚΕΛΔΥ:** \*Centre for Differential Diagnosis and Support.(Κέντρο Διάγνωσης Διαφοροδιάγνωσης και Υποστήριξης)

**GOV:** Government. According to the law, laws publish in governments' newspaper.

**WHO:** World Health Organization

**ZPD:** Zone of Proximal Development

**UNESCO:** United Nations Education Scientific Cultural Organization

**UN:** United Nations

**LLD:** Language Learning Disability

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# **1 Chapter : Introduction to the study**

## **1.1 Introduction**

The main goal of this research was to investigate how Greek teachers use computer devices in the teaching process for students with reading and writing difficulties in primary school in order to help students with those devices. It is an important consideration to see how teachers use computer technology during the teaching. The aim was also to find out whether teachers in Greece were experienced in working in an ordinary classroom with children who have reading and writing difficulties, using computers without having any special educator in the classroom.

As a new teacher, I have never studied those topics in my university courses; however, I have read scientific articles and text books by my own initiatives, which were not recommended as syllabus in my bachelor degree. This thesis begins by giving a short overview of how computers are used in both education and special needs education, in order to understand the practices worldwide. It focuses on teachers' practices while they teach reading and writing skills to students who are struggling with them. The chapter gives information about inclusive education in Greece, as well. The research question will be implemented with sub-questions. The chapter finally gives an overview of how the thesis has been organized.

## **1.2 Background of the study**

The impact of technologies and computers specifically, is a classic example of the way our lives have changed. There is no doubt that technology makes our lives easier (Selwyn, 2011). The word 'computer' comes from the word compute which means 'to calculate' (Selwyn, 2011). In 1922, Thomas Edison predicted that «the motion picture is destined to revolutionize our educational system and that in few years it will supplant largely, if not entirely the use of textbooks» (cited in Cuban, 1986). The 'first generation' computers were introduced in the late 1930s and they were large and expensive to operate. At that time computers could handle only numbers. Later, they implemented them with digital numbers and alphabetic characters, graphics and pictures. The 'second generation' computers utilized transistors, were smaller,

faster and more energy efficient than their predecessors. In 1958, computers' size reduced a lot. New operating systems were meanwhile developed; this allowed the simultaneous running of many applications. These computers developed between 1964 and 1971 consisted the 'third generation' machines. The microprocessor ushered in the 'fourth generation' computers. Those computers were smaller and much faster than before. In 1981, personal computers for home use were introduced. These small computers were very powerful and permitted linking of several machines that eventually led to networking and the internet. The 'fifth generation' computers include the present day computers. These devices are based on the concept of 'Artificial Intelligence'. They utilize various new technologies as 'Voice recognition', which recognizes user's voice and responds to it. It took almost 40 years to have computers as we know them today (O'Regan, 2012).

Education has naturally been influenced by computers. Computers in cooperation with internet technology have brought about teaching in a very different dimension. The early use of computers in education was primarily in mathematics, science and engineering as a mathematical problem-solving tool, replacing the slide rule and thus permitting students to deal more directly with problems of the type and size most likely to be encountered in the real world. As years passed by, more and more schools started introducing new teaching approach via computer, which was accepted by enthusiasm; film is a good example (Cuban, 1986).

In the late 1960s, computers were widely available; by 1974, over two million students used computers in their classes. By 1975, 55% of the schools had access to computer devices and 23% were using computers primarily for instruction purposes. James Kulik at the University of Michigan (Kulik & Kulik, 1991) found that computer-based education could not only increase scores from 10 to 20 percent points, but also reduces the time which is necessary to achieve goals by one-third (Molnar, 1975).

In the late 70s, computers started spreading in schools. Sigmund Papert, who is one of the avant garde of the introduction of computers in schools, referred that "children can learn what they love" (Papert, 1980). The purpose was to bring students to initial contact with various uses; as supervisory medium tool for teaching, as knowledge exploratory tool and as communication and search information tool in the context of everyday school activities using appropriate software (Vincent, 1992). Meanwhile, digital technologies have appeared and consolidate their daily use. Computers can also be a game tool. Researchers have indicated that game based learning could be the best way to trigger students' learning motivation

(Provost, 1990), (Papastergiou, 2009). In recent decades, the educational system has become computer dominated and has gone beyond computer notebooks and tablets (Brusilovsky, 2003). Those technology devices were implemented with online network in order to be really helpful for teachers and students (Selwyn, 2011).

In a research that took place in 2006 is referred that most of the educators agreed that computer access and literacy have become vital for young learners in the 21st century (Lovell & Phillips, 2009). Computer technology use and its software are considered as common educational tools in most of the western schools, because they include beneficial options for teachers by creating individualized teaching to students with difficulties. In addition, computer technology use provides an individual way of working and at the same time offers applications for self correction (Lovell & Phillips, 2009).

In Greece, the first attempt to implement schools with computer technology policies began in the early 1980s. At the late 80s, teachers introduced computer use in order to teach writing, since they had found out that word-processing had motivated students in writing. Writing skills got supported by computer use (Makrakis, 1988). Until 1992, computers had become a well-known technology only for private schools. Although computer use had well documented benefits, computer technology was not well integrated into primary school classes (Lovell & Phillips, 2009). In Greece, there was a delay in central state planning of implementing primary schools with ICT services and equipping them with computers. Each school used to have only one computer for all classes. According to the Curriculum Framework in 1997, there was not any plan of implementing computers in early primary education. For the first time ever, each primary school should have a computer in classroom according to Interdisciplinary Curriculum Framework (Ministry of Education 2003). The specific purpose of having computers in primary school was to get students familiarized with the basic functions of the computer.

Nicholas Gane stated that Internet related technologies have altered everyday life's pattern. Students get used to practicing new technologies, often before entering the school system (worth mentioning: Internet, Skype, Games) (Gane & Beer, 2008). It is well known that in early primary education the main use of computers is only for playing; the aim is to learn through this. In addition, it has been reported that a game based learning approach might provide a good chance to stimulate students' way of thinking during the process of cognitive development (Selwyn, 2011). Computer games are able to boost motivation owing to some

characteristics; this can be obtained if those games contain programs which are characterized by adventure, challenge and freshness.

From the above, it is understood that in recent years all the economically developed countries, try to integrate the use of personal computers, computer networks, satellite systems, mobile telephony and digital television etc. in teaching of various school subjects. All these technological tools are grouped into a category, which led to the development of a new concept, namely Information and Communications Technology (ICT). However the ICT integration process in schools and their use by teachers and students are affected by many factors. There are several researchers (Winnans & Brown, 1992) (Kellenberger D. , 1996) (Robertson, Caldert, & Fung, 1996) (Germann & Sasse, 1997) (Roop, 1999) (Cox, Preston, & Cox, 1999) (Paraskeva, Bouta, & Papagianni, 2008)

This led several researchers (Winnan & Brown, 1992) (Kellenberger, 1996) (Robertson, Caldert, & Fung, Pupils, teachers and palmtop computers, Journal of computer assisted learning 12, 194-204, 1996) (Germann & Sasse, 1997) (cited in Paraskeva, Bouta, & Papagianni, 2008) (Cox, Preston, & Cox, September 1999) (Roop, 1999) attempt to investigate and categorizing of these factors, with the aim of revealing a more clear view of the extent to which ICT is ultimately integrated into the school environment and contribute to increasing the effectiveness of the teaching act. Most research studies relate to individual but also environmental factors, or in other words, factors related to the school environment. In addition, the literature is divided into studies that examine factors which encourage, and on studies that emphasize on factors, which discourage teachers to use ICT in schools.

To conclude, Information and Communications Technology hold an array of opportunities for teachers to implement their teaching goal. Social media, web tools and mobile apps are nowadays available and easy to use. They may enrich teachers' teaching methods with innovative ideas and at the same time give the opportunity to the students to be more active in the learning process and increase their interaction (Pacansky-Brock, 2013). Another reason which enhances the use of educational computers is the fact that children like working with computers (Rooms M. , 2000)

## **1.3 Personal Experience**

To teach students with reading and writing difficulty in the ordinary classroom is a complicated process. It requires a demanding daily program and a well prepared teacher. (Southampton) As a primary school teacher, I have worked in 2 different schools in Norway and in 1 primary school in Greece. This experience made me realize that teachers in Norway, approach their students by using completely different strategies, comparing to the Greek ones. Every teacher should use modern and effective practices in order to implement his teaching strategies and help students with reading and writing difficulties. (Rosenshine, Spring 2012) Those two difficulties are the most common difficulties in Greek schools, according to Primary Teachers Association in Greece for the year 2008. This is the reason why I got inspired to do my research on this field. I wanted to investigate how teachers in Greece use computer technology in education in order to teach students with those difficulties.

## **1.4 Education in Greece-Inclusive Educational System**

Greece has adapted the same principle as the United Nations Universal Declaration of Human Rights on December 10, 1948 suggesting with the Article 26 that “Everyone has the right to education. Education shall be free, at least in the elementary and fundamental stages. Elementary education shall be compulsory”. In 1981, for the first time in the history of Greece, a socialist government came to power. It focused on changing internally the educational system into being more democratic and not on changing its structure. Since then, compulsory education in Greece is 10 years included the kindergarten (1year), primary school (6 years) and secondary school (3 years). (OOSA, 2011) After that, students can choose whether they want to continue their studies in Lyceum, which means that they will have to take exams in order to enter to the University, or to continue their studies in technical high school. This law intended to expand the decision made about the university studies and introduced new measures, such as the establishment of postgraduate study.

All the changes in educational system were based on the philosophy of inclusiveness; that is, students with disabilities could attend the public school, the school which is for all, an inclusive public school which provides inclusive education to all students with or without disabilities, under the auspices of the UN (United Nations) and UNESCO (the International

Convention on the Rights of the Child 1989, Declaration Salamanca and action framework for special education-World Summit on Special Education, Salamanca, Spain, 1994). All European countries agreed to support students with special needs in the context of educational policies in general and recognized the “School for everybody” - as called in Charter of Luxembourg (1996). A School for all - provides an important basis to ensure equal opportunities for students with different types of special needs in all aspects of life (education, vocational training, employment and social life). Greece has recently signed (September 2010) the International Convention on the Rights of Persons with Disabilities (Article 24) and the Optional Protocol to the Convention adopted by the UN General Assembly (2006) and by EU. States did not only recognize the right to education for people with disabilities, but also forced to develop a school for everyone in order to ensure inclusion and offer an equal opportunity in learning to everyone. (UNESCO, 2000)

Special education is complicated in Greece. Special education, like general education, is compulsory and it forms an integral part of free, public education. The state is willing to guarantee the nature of special needs education as obligatory, free and public. Moreover, it ensures the availability of free public special education and training to the disabled of all ages and for all stages in education. With the law of 2008, the state ensures that all citizens with disabilities and special educational needs have equal opportunities to participate and contribute to society and to lead an independent life with economic self-sufficiency and autonomy, with parallel protection of their rights to education and social and educational integration.

### **1.4.1 Legislation for Special Needs**

The state and all states’ services recognize disabilities as part of human existence, as well as a complex social and political phenomenon (Government law). In any case, the relegation of a disabled person’s right to participation or contribution to the social life should be avoided. The legislation refers to the field of special education with the term «special training and education ». Training means almost the same like education.

Greek state has established public diagnostic centers for students with disabilities. At those institutes, students with disabilities and special educational needs are divided into levels according to their disabilities. Each group may attend courses in: a) an ordinary class supported by the class teacher in cooperation with public diagnostic centers\*, operating in the

afternoon hours, b) an ordinary class with parallel support from an additional teacher and c) a special organized integration class which operates with two different types of programs. The first one is a 15-hour weekly programme. A student can attend a class with an assent to the school teacher. The second one involves a specialized individual extended hour program, established by the specific diagnostic centre, adapted to students with more severe special educational needs. This specialized program can be independent of the public system and adjusted to the students' needs. When the attendance is difficult for a student with disabilities and special educational needs, then education could be provided in: separate special schools, schools situated in hospitals or/and in rehabilitation centers. For other disabilities, such as deafness, blindness and autistic spectrum students, there is extra legislation which legitimates those students to attend special public or private schools.

According to the Organization for Economic Cooperation and Development (OECD, 1995), the most distinctive part of the Greek educational system, and its combination of centralism and legalism, is evident in the organization and administration of the system as well as in the curriculum. That means that the educational system has been organized and functions as the state has recommended. Centralism is found in the National Curriculum, the school timetables and the textbooks, which are common for all schools (Zoniou-Sideri, 2004). That means that teachers cannot escape from the practices that the state requires. It is not allowed to use, for example, other books, except from those the state proposes. It's worth mentioning that education in Greece is parallel to the religion. They are both regulated by the central government with acts, circulars, presidential decrees and programmes decided by the Ministry of Education.

## **1.5 Research questions and sub questions**

As an open semi-structured interview, many questions came up during the interviews. The research question was “how do Greek teachers use computer and technological devices in order to educate students with reading and writing difficulties in primary school”. The aim was to find out how they could efficiently help their students.

In order to investigate this question in depth, I used some sub questions about 1) the term reading and writing difficulties, 2) problems, 3) methods and practices that are applied.

- How do teachers understand and define reading and writing difficulties?

- To what extent do teachers believe that computers are effective for teaching students with reading and writing difficulties-how they use them?
- What are the problems / obstacles that teachers face in using computers for teaching students with reading and writing difficulties?

## 1.6 Reasons for carrying out the study

In the recent years there has been investigated many studies with main purpose to understand the term “learning difficulties” and to determinate the ways to deal with them. However the effective implementation of these results in practice, have not been fully achieved (Pressley, 2002) Research has shown that there are two main obstacles to effectively addressing the practice of students’ reading and writing difficulties. The first obstacle relates to the lack of knowledge and training of teachers, and the second to the lack of teaching resources. The teacher shortage is an issue with important consequences, as when teachers do not know how to teach students with learning difficulties then the problem can not be addressed(Moats, 1999) On the other hand, the lack of resources leads directly to a situation in which there is inequality in schools as students with learning disabilities are developed in relation to others (Fielding, 2007) The above combined with the high cost of interventions highlights the seriousness of the situation Scamacca (2007).

There are several research studies according to which new technologies and especially the computers can help in tackling the students’ difficulties in reading and writing. The main reason for the above is that computers offer the possibility for specialization and customization to the needs of students with learning difficulties (Rooms M. , 2000) (McKeown S. , 2000) (Lewin, 2000) (Nicolson, Fawcett, & Nicolson, 2000) (Detheridge T. , 1996) . Computer technology can also be a solution for students with reading and writing difficulties, because of its capacity to provide highly specialized instruction and practice for relatively low cost with relatively high and consistent fidelity. For example empirical research of Torgesen & Barker (Torgesen & Barker, 1995)indicates that computer technology may be particularly well suited to provide support for instruction at the word-level reading skills that are so challenging for students with dyslexia (Torgesen & Barker, 1995)



My motivating for carrying out this study was to investigate an area that is inadequately researched in Greece. As a new teacher, I want to use modern methods of teaching ordinary classes. My experience by working in a public school in Norway helped me to point out the differences in how teachers in both countries use computers in classroom. Teachers' practices in how they use the existing computer devices, applications and software to students with difficulties in reading and writing, is a field that not many researchers have investigated in Greece, because of the restrictions and difficulties they would deal with, especially due to inadequate Greek literature. The poor finance in Greek schools, is discussed further in this thesis.

## **1.7 Structure of the thesis**

This research is divided into five chapters. Chapter one presents briefly the background of the study, the educational system in Greece, the research question and the aim of the study. Chapter two presents the conceptual framework according to Socio-cultural theory and gives detailed definition of the terms that are used, such as reading and writing difficulties, computer use and teaching practices. Research design and method, instruments of data collection, data analysis, validity and reliability and ethical consideration are presented in the third chapter. Presentation and discussion over the data is developed in the fourth chapter. The presentation and analysis is done according to the basic principles of thematic analysis. Chapter five contains the summary of the research findings, conclusion, recommendation and list of references and appendices.

## **2 Chapter: Reading and Writing difficulties and computers**

### **2.1 Definition**

An exact definition of Information and Communication Technologies (ICT) is fairly complex. This is because the ICT sector refers to activities that are associated with constantly evolving technologies and therefore unstable. In this sense, the conceptual approach of ICT often becomes obscured a clear demarcation (FEOR Foundation for Economic & Industrial, 2006) the predominant definition of ICT is the one given by the UNESCO (2002). According to UNESCO the concept of ICT is based and determined in accordance with two other words namely “Informatics” and “Information Technology”. Specifically Informatics is a science which makes tool various other sciences by offering the opportunity to develop specialized skills (Piliouras, Simotas, Stamoulisi, Fragaki, & Kartsiotis, 2011) Furthermore, the Information Technology is related to planning, implementation and evaluation to the use and maintenance of information management systems. Information Technology includes hardware and computer software, considering organizational and human factors and industrial, commercial, governmental and political impact of all these. (Piliouras, Simotas, Stamoulisi, Fragaki, & Kartsiotis, 2011)

On the other hand, information technology is defined “as the set of computer systems and technological applications (artifacts) of the Informatics in society” (Piliouras, Simotas, Stamoulisi, Fragaki, & Kartsiotis, 2011) while the Information and Communications Technology (ICT) is defined as “the combination of Information Technology with other associated technologies and in particular that of communication” (Piliouras, Simotas, Stamoulisi, Fragaki, & Kartsiotis, 2011) Similarly, according to Blurton (1999) the Information and Communication Technologies is a set of technological tools and resources used to communication through the creation, dissemination, storage and management of information. The ICTs are consisted of three components. The first is the technology, the second is the information conveyed through the technology, while the third is the process of communication and information that takes place with the use of the technology (Rhine, 2006).

On the other hand, according to Hamelink (1997) ICTs are comprised of five components based on the function and especially: 1) capture technologies, 2) storage technologies, 3) processing technologies, 4) communication technologies and 5) display technologies.

Today the importance of ICT is growing more and more, as well as knowledge for the modern world also includes the ability to understand and use technology for various reasons (personal and social) (Raptis & Rapti, 2002).

## **2.2 The importance of ICT in the educational process**

With the integration of ICT in the educational process, methods and practices of teaching and learning differed considerably. It is considered that this integration can increase the effectiveness and efficiency of the educational process, indicating the great importance. Additionally the flag of ICT increases after studies showing that if you can make a positive contribution to solving the problems associated with teaching students with learning disabilities. This is because ICT pronounce the opportunity for collaborative learning and effective communication and thereby contribute to the development of the educational process (Piliouras, Simotas, Stamoulisi, Fragaki, & Kartsiotis, 2011) In order to refer to the procedure that was followed for the integration of ICT in schools we note that first was joined the lesson of Informatics, and then began the use of various technologies. The integration was done according to various approaches of several sciences such a Pedagogy and Information. In Greece the process began in 1990, when ICT for first time began to be used in the educational process. The main purpose was to be developing new skills of teachers and students (Baron, 1989, cited in Piliouras et al., 2011, p. 13).

Several research studies (Pea, 1993) (Murphy, 2003) (Osborne & Hennessy, 2003) have focused on exploring the benefits of ICTs in education process. Specifically, according to Pea (1993) new technologies are changing the way of thinking, as well as the attitudes and the perceptions of both teachers and students. Also Murphy (2003) after his secondary research concludes that ICT stimulate students and motivate them to participate more actively in the education process. This is because ICT destroy the boundaries between school and outside reality of which makes the lessons more interesting. Also, ICT has enabled the student to

easily understand the complex concepts through the use of various audio-media instruments. Similarly, Osborne and Hennessy (2003) following an investigation arriving to the conclusion that through ICT in schools are developed new learning environments that enable teachers and students to be more creative.

To achieve the above, however, it is important the integration of ICT to be done in an appropriate way (Dede, 1998). It is particularly important to avoid the misuse of new technologies, since in a lot of cases students use computers for other activities not related to their education. Teachers are the ones who will contribute to the proper use of new technologies in schools and therefore their effective training is absolutely necessary.

The framework of a study is often related to the philosophical basis, on which the research takes place and the researcher has to link the aspects with the research question. The framework is important in a research, because it makes it easier for users to understand the aim of the research. I tried to use the sociocultural theory as framework to teach students with reading and writing difficulty through computers. This framework is also great significance when the researcher analyzes and discusses the data.

### **2.2.1 Factors that facilitate the use of ICT in the school**

Several empirical studies have focused on factors that encourage teachers to use new technologies in the school environment. In detail, Cox et al. (1999, cited in (Mumtaz, 2012), carry out research on a sample of 72 teachers in order to reveal the factors that contribute to the use of ICT. The research concludes that the extent, to which teachers are encouraged, depends on the very utility of new technologies in practice. In particular, new technologies should make school lessons more interesting, more fun and more easily understood by students. It is also important that ICTs contribute (Cox, Preston, & Cox, 1999) to improving the presentation of materials, giving potential for greater flexibility and authority to the teacher, and in addition to facilitate the administration and organization of the school environment. To be considered useful ICT, are necessary teachers to have knowledge about them. Specifically, most studies have concluded that there is a positive relationship between knowledge of ICT and the intention to use these in the classroom. Germann and Sasse (Germann & Sasse, 1997) respectively concluded that teachers participating in training programs on new technologies have greater interest in ICT and the ways in which these could be applied in teaching practice. Ross, Hogaboam-Gray, and Hannay (Ross, Hogaboam-Gray,

& Hannay, 1999), agree with the above views, noting that those teachers who use the new technologies in high degree use them more in educational process in order to increase the effectiveness of teaching. On the other side according to Lam (Lam, 2000) teachers prior to using ICT in teaching should be personally pressurized for these benefits.

Veen (Veen, 1993) on the other hand, sets that the new technologies are used by teachers in school, should be based on pedagogical methods and practices. It is important to note that according to other researchers (Hadley & Sheingold, 1993) the desire of teachers to integrate ICT in schools, depends largely on whether the new technologies offer opportunities for personal development skills and abilities, but also for direct and effective communication with colleagues.

Individual characteristics seem to affect the inclusion or not of ICT in school. Specifically, the belief that the teacher can be effective, when using new technologies, significantly affect to a point to which he will eventually accept the ICT and will it integrate into the job. For example, in an earlier study, (Kellenberger, 1996) after primary quantitative research, using questionnaires on a sample of 222 teachers, found that self-efficacy, significantly affect the acceptance of ICT. According to this researcher, self-efficacy positively correlated with experience in new technologies, which the teacher had in the past, as well as the value, add this experience to his needs. Molebash and Milman, (Molebash & Milman, 2000) (cited in D. Willis, 2000) also refer to the importance of self-efficacy factor, confirming again that the participation of teachers in training programs on use of ICT, increasing their trust in themselves, which ultimately contributes to the integration of ICT in teaching. The importance of self-efficacy of teachers, such characteristics mentioned by Ashton and Webb (cited in Paraskeva, Bouta, & Papagianni, 2008) stems from the fact that this is directly related to educational practice. Therefore basic condition to integrate the ICT in classroom is to consider themselves effective in the use of such technologies. This is proved by the research of Ropp (1999) whose purpose was to investigate the relationship between individual characteristics of teachers and the degree of acceptance of ICT. This research was based on a sample of 53 teachers, while measured: 1) attitudes towards computers, 2) technological adequacy, 3) stress by using computers and 4) self - efficacy in the use of ICT. Ropp (1999) concludes that the “self-efficacy” in the use of new technologies and the positive attitude towards computers, are the most important factors that influence ICT integration decision in teaching practice.

The above appears to could be applying to the Greek school reality, which is revealed by the survey of (cited in Paraskeva, Bouta, & Papagianni, 2008) based on a sample of 286 teachers. The purpose of this study was to investigate the relationship between characteristics from individual secondary school teachers and their beliefs about self-efficacy in the use of new technologies. The research concludes that Greek secondary school teachers have an increased sense of self-efficacy in what concerns the use of new technologies, but also high confidence in their capabilities. This of course varies according to the individual characteristics of each teacher, such as incentives, professional values etc.

Germann and Sasse (1997) arrive to the conclusion that teachers participating in training programs on issues related to ICT, showing a higher degree of self -efficacy while further interested in learning more about, how new technologies could be applied to help increase the efficiency of the teaching process. Although this is not understood, there are significant differences in the intention of use of ICT in schools, among teachers who have been trained in the use of ICT and those who have not gone through such a process. This issue needs further exploration.

### **2.2.2 Factors that complicate the use of ICT in the school**

In the literature several empirical studies examining the categories of factors, which prevent the integration of ICT in schools are presented. Indicative, research of Robertson (Robertson, Caldert, & Fung, 1996) cited in Mumtaz, (Mumtaz, 2012)revealed six categories of factors that discourage the integration of ICT in schools, namely: 1) negative attitude towards organizational changes, 2) resistance to external interference in the teaching process, 3) time management problems in learning and integrating new technologies, 4) lack of support from the administration, 5) educational concepts, 6) personal and psychological factors. Winnans and Brown, (Winnans & Brown, 1992) referred to the lack of time necessary for the successful integration of ICT in the school curriculum as a major constraint.

Another important factor with negative impact is the lack of support to teachers from the school and mainly from the administration (Hadley & Sheingold, 1993) , (Butler & Sellbom, 2002), (Slaouti & Barton, 2007)Similarly, Rosen and Weil (1995) investigated 117 primary school teachers and 200 secondary schools, designed to investigate the factors that discourage teachers to use new technologies especially computers in the classroom. This research reveals the following factors: 1) comments substructure, 2) degree technophobia and 3) concern about

possible errors in using new technologies. Moreover, Rosen & Weil (Rosen & Weil, 1995) indicate that the socio - demographic characteristics of teachers such as age, gender, teaching experience and socioeconomic status play an important role as to whether teachers will accept and incorporate new technology in school.

Studies in Greek reality also show similar conclusions. For example Giavrimis, Papanis, Neophotistos and Valkanos (Giavrimis, Papanis, Neophotistos, & Valkanos, 2010) found that the lack of knowledge, low self confidence, the fact that initial education and training is insufficient on a sample of 118 teachers, that the factors which discourage teachers to use ICT in the classroom. With this statement agree also Demetriadis (Demetriadis, et al., 2003) who carry out research examining the views of secondary school teachers who were trained in ICT. The results of this survey show that while teachers expressed interest in using new technologies in teaching, it was observed tendency to adapt ICT to the traditional teaching model. This shows that in addition to the various inhibitors for the implementation of ICT already mentioned will need to focus on ways to change the negative attitudes that maintain several teachers to change. This view is consistent with the findings of Vosniadou and Kollias (2001) according to which the major inhibitory factor for the integration of ICT in the classroom are not the skills that teachers develop during the training programs but their refusal to change their traditional and often conservative pedagogical concepts that have developed over time.

Tzimogiannis and Komis, (2004) cited in (Grigoriadou, Raptis, Vosniadou, & Hunter, 2015) arrive at the conclusion that the factors which make educators cautious on the integration of ICT in educational practice are: 1) fear whether to manage easily acquire basic ICT skills, 2) uncertainty about whether they will be able to use ICT in teaching practice, 3) fear because students have more developed ICT skills by themselves.

On the other hand, according to a survey of Diliou and Koutouzis (2012) the factors influencing the decision of teachers to integrate ICT in the classroom, related to their personal reservations about usefulness of these applications. The cognitive adequacy in lack of permanence in multigrade can contribute substantially to the introduction of ICT in education. Additionally important is the role of managers and colleagues, as well as pointed by Diliou and Koutouzis, the collaborative nature of governance and the role of the Director reinforce positive attitudes of teachers in the use of new technologies.

It is also important to note that the factors that differentiate the attitudes of teachers for new technologies also include the socio - demographic characteristics (age, gender, education, etc.). This is demonstrated by many empirical studies (Evans-Jennings & Okwuegbuzie, 2001) (Levine & Donitsa-Schmidt, 1998) (Woodrow, 1994) For example, according to a survey of Rosen and Weil (1995) women teachers seem more reluctant to integrate ICT in the school environment. Additionally the Shapka & Ferrari (Shapka & Ferrari, 2003) reach the conclusion that the level of education is what differentiates the attitudes of teachers towards ICT, as teachers of primary education have a greater fear of such integration in the school environment, in relation to teachers of secondary education.

From the above studies it is revealed that there are various inhibiting factors for the integration of new technologies in schools. Most studies suggest addressing the problems; require teachers to participate in education and training in new technologies. Nevertheless, no evidence was found to indicate if teachers after participation in such programs continue to face the same problems or are affected by different factors in their decision to use ICT in the classroom.

From the literature review that proceeded, it revealed that the investigation of the factors which affect positively or negatively the decision of teachers to integrate ICT in the classroom has been made by several researchers both abroad and in Greece. This is because knowledge of the main obstacles is very important, because in this way they can avoid any problems related to the acceptance of ICT.

### **2.2.3 The use of ICT for students with difficulties**

Studies that are related to the use of computers are divided into two categories. the first category includes studies which investigate the use of computers in order to develop specific skills of students with difficulties. On the other hand, there are researches that trying to investigate computers as a means of facilitating students with learning difficulties in accessing and understanding the lesson. (Samara, 2003) One of the major advantages of new technologies for students with difficulties in reading and writing is the motivation for learning, attention concentration and easier integration of students with difficulties in the group, learning at a personal pace, but also gradually learning (Detheridge, 1996)



The most important tool of new technologies used for people with learning difficulties in writing is the “text editor”. Through this, students with writing difficulties have the opportunity to formulate the text, to correct their spelling mistakes, and to carry words and sentences. In this way, students with difficulties can become more creative and be able to more easily express their thoughts and ideas (Detheridge, 1996). There is also software that is named as “word banks”. Such programs can prove very useful and help the student to more fully express his thoughts without leaving gaps and half words. Useful tools are also the text correctors. Those tools provide students with difficulties greater autonomy while contributing to the improvement of spelling (McKeown, 2000). Another tool that can be used for students with difficulties in writing is the “thesaurus”, which gives synonyms and contributes to a better understanding of words associated with other known words for the student. (Detheridge, 1996) Finally in order to improve the spelling difficulties, there is software that based on play practical exercises (Crivelli V. , 2000)

Similarly, Nicolson, Fawcett & Nicolson (2000) through literature review reach at the conclusion that the use of RITA, a computer based literacy support software, can solve reading problems that many children have. According to the authors, as age increases, the more effective is this software. Generally some systems and software allow students to underline and read facilitates the synthesis of sounds and graphs. Some programs may allow user to click on an unknown word in order to hear one synonymous or an explanation. (Crivelli V. , 2000) This improves student’s vocabulary. The most important strategy in those programs is that they offer the reading process into small steps.

Therefore, good design of various software that is used for students with learning difficulties is of great importance. Unfortunately, in several cases, the minimum percentage of the educational material is available in alternative formats to use new technologies. Often students with learning difficulties need additional assistive technology and specific instructions mainly by teachers. In this regard, there are surveys (Ofsted, 2002) that show major obstacles. Namely lack of time, insufficient knowledge of the use of technologies to address literacy problems and lack of information with existing software. Teachers should observe student’s difficulties in order to adopt specific methods for writing and reading (Lewis & Oglivie, 2002).

## **2.3 Sociocultural theory**

One of the most classic educators and psychologists, whose theory played a central role in the understanding of teaching-learning process, was Lev Vygotsky. In his book “Mind and Society” (1978), Vygotsky introduced and proposed an innovative theory about human development. He described the relation between an individual (student) and the society (class) and stated the interaction between learning and development. More specifically, according to Vygotsky, a child depends on adults’ experiences which teach him how to learn according to their knowledge through social interaction. He introduced the theory which is known as zone of proximal development (ZPD) that has been defined by him as:

*«The distance between the actual developmental level as determined by independent problem solving and the level of potential development as determined through problem solving under adult guidance, or in collaboration with more capable peers»* (Vygotsky, Mind in society, 1978).

The zone of proximal development describes a child, who receives support from a knowledgeable adult, who uses individual tools and signs and by which student moves from the minimal level of knowledge to a higher level of knowledge, without any external guidance or assistance (Vygotsky, 1978) (Rogoff, 2003). According to his theory, students are not passive recipients. Teachers help students to achieve the knowledge by using individual tools, which in this case may be a computer. Students with difficulties in reading and in writing can achieve the knowledge, as teachers have on mind that the prerequisite for the success of the learning process, is to target on zone of proximal development. Computers may be tools through which students can acquire knowledge.

## **2.4 Sociocultural Perspective in Teaching**

Lately, the terms of zone of proximal development and sociocultural theory appear widely in many studies, concerning teaching and learning in many fields, such as teaching mathematics, reading and writing to students with difficulties on those fields, retarded and/or gifted students. This can be obtained by the use of information technologies and computer mediated communication, which could be applied to all ages, from preschool children to adults (Kozulin, Gindis, Ageyev, & Miller, 2003).

Many researchers have drawn the attention to the fact that language is the first and foremost skill of a child’s life (Vygotsky, 1978). Students need language skill and communication in

order to collaborate with their peers and their teachers. Language is a tool which people use so as to accomplish many things (Vygotsky, 1962). Teaching reading and writing should be organized in order to facilitate collaboration between teachers and students. Language skills are the base to develop reading and writing. Learning process arises when students solve problems either by negotiating their meanings or by showing what they have already learned.

It is of vital importance that well trained teachers take responsibility in order to fulfill educational goals. Lately, people, as well as students, do not spend sufficient time in reading. Teachers use computers in order to motivate students to read, since they regard it as an interesting tool. (Moeller & Reitzes, July 2011). Learning to read takes years of practicing and as acquired skill needs many instructions (Hulme & Snowling, 2009). Later on this study there is a definition for reading and writing.

By using computer technology teacher can enrich reading and writing skills, with the appropriate teachers' and classmates' assistance, when needed. This is what is known as 'scaffolding', which means giving to learners help when they need it in order to be able to work on their own (Rogoff, 2003). Bruner (Wood, Bruner, & Ross, 1976) has offered a short definition of *scaffolding* as well that worth mentioned. *'Those elements of the task that are initially beyond the learner's capacity permit him to concentrate upon and complete only those elements that are within his range of competence'*. Scaffolding, offers encouragements and the ability to give so much information as it needed in order to allow students to do more work by their own. Teachers adapt tools and methods in accordance with the needs that each student has in the classroom. Considering the above theory, students with reading and writing difficulty can learn through adapted materials, collaborative teaching process and by using a variety of teaching tools and methods and of course by mimic their classmates.

The theory of scaffolding can be useful in any intervention program, especially in the fields of writing and reading difficulties. Teachers have already recognized the importance of those tools in learning and teaching. Their practices vary depending on the environment they are enforced in. In Greece, for example, it is a great challenge to use computers in teaching writing or reading, since those practices are not yet accepted.

## 2.5 Definitions of the terms

### 2.5.1 Reading Difficulties

This research is dealing with one of the most modern concerns in national perspectives on computer technologies in education for teaching reading and writing to student with difficulties on those fields. (Aikenhead, 2005) According to the British Dyslexic Association, the International Dyslexic Association, and the European Dyslexia Association, disabilities encompass between 5 and 12 percent of the population in Europe. (Gyorfi & Smythe, 2010). According to the European Dyslexia Association in 2004, 8% of the students of the European Union countries have specific learning disabilities or dyslexia. That means that more than 25 million people deal with serious difficulties which are related to reading and writing process (Mouzaki, 2007).

Reading is an important ability, which everyone must own. Many researchers have given the definition of reading difficulties, but in order to understand better what they really are, it should first be defined what reading is. At this point, it should be stated that only the term reading difficulty is going to be dealt with and other terms will not be detailed discussed. There is plethora of definitions about reading; Gough and Tunmer (1986) referred to, as in the simple view of reading, which is a process that happens through two components, decoding and comprehension.

*“It is a result, a comprehension between Decoding and Listening Comprehension; though simple, the ability to decode words is essential and accepted skill for reading process; those with very low decoding skill or very low oral comprehension skill will be poor readers”*

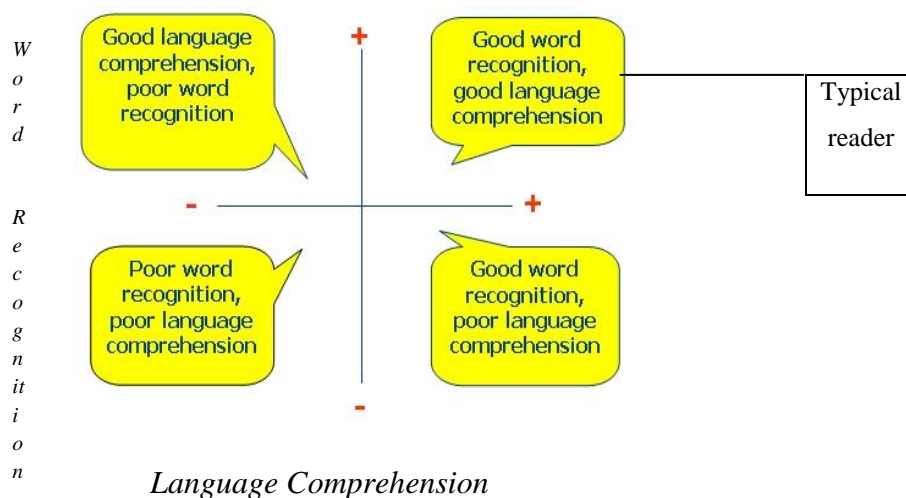
According to the “simple view of reading” theory, successful reading involves two basic skills; decoding and comprehension. In fact, reading is the most difficult task for the young brain to undertake. (Sousa, 2007) Nowadays, reading instructions start sooner than ever before. There are many countries in which reading instruction starts in the kindergarten. (2014) Reading, for most of the societies, it is vital and holds the key to education. (J.Snowling, 2000) A child should learn two skills by the time he starts primary school, he needs two skills; phonemic awareness and letter-sound knowledge. Phoneme awareness is the ability to identify and manipulate specific sounds in spoken language and letter sound knowledge refers to the capability of combine the correct sound of letters of the alphabet.

(Caroll, Bowyer-Crane, Duff, Hulme, & Snowling, 2011) Reading process begins by making the properly association between printed words and pronunciations.

Decoding is a process of word recognition during which printed words are transformed. Decoding demands phonological and lexical knowledge. Comprehension specifies the meaning to words, sentences and texts. This skill requires language mastery like syntax, morphological and discourse knowledge. There is a strong correlation between phonological awareness and reading process. (Kirk, Gallagher, Coleman, & Anastasiow, 2012) Reading comprehension is the outcome of word decoding and linguistic comprehension skills. Decoding is vital for reading. If a student cannot decode, it is probable to face problems while extracting the meanings of written words. The reading process is more complex than learning the sounds and letters. Learning to read in an alphabetic system, such as Greek, requires not only the ability of connecting speech sounds and letters, but also wider language skills. When the reading ability is significantly weaker than expected, corresponding to the age and education of the individual and when the reading disability prevents the individual's school performance or daily activities that require reading skills, those determine the two criteria so as to diagnose reading difficulty.

Simple view of reading model has to be discussed more in depth. According to Gough and Tunmer (1986), a student who has obtained a good word recognition and good language comprehension is a good reader. On the other hand, a student with poor word recognition and poor language comprehension is also a poor reader. At the same time a student with a good recognition and with other skills weak, is also a poor reader.

Figure 1: “simple view of reading”



The simple view of reading was designed to show what two skills are required for the good reading. The first depends on the reader and can work out with the words on the page (that is, word recognition processes or decoding) and the second depends on the development of language comprehension (that is, written texts as well as spoken language are understood and interpreted). Both of them are necessary. (Rose, 2006) While a teacher teaches reading needs to give attention to both dimensions: word recognition and comprehension. It is worth mentioning at this point that ‘comprehension’ is about understanding spoken and written language. Children who are learning to read but who cannot decode the words on the page are prevented from understanding the text fully. However, even if students recognize, can say and understand the words on the page, this does not mean that they will understand the text as a whole. If a delay and difficulty in reading skill, slow reading rate, substitutes or missing words during reading process should aware the teacher about some kind of underlying problem. (Kirk, Gallagher, Coleman, & Anastasiow, 2012) Non language factors affect reading ability as well. Those factors are the teachers’ instructions, motivation, attention, conceptual and reasoning skills, neurological and physical factors. (Jennings, Lerner, & Caldwell, 2011) Reading difficulties can derive either from environmental factors, physical factors or both. Environmental factors are often social and cultural and include a limited exposure to the language during the preschool years and a weak communication with parents. Family environment where a child lives plays the most significant role for development of those abilities. Students, who grow up in low literacy families with little exposure to books and languages and experiences, enter school with insufficient knowledge of alphabet, sounds and letters’ names and that causes a huge problem in their learning process. (Butler & Silliman, 2002) Reading difficulties can be divided into several categories: those who deal with reading (decoding), with language (comprehension), dyslexia, hyperlexia, language learning disabled. The last three groups encounter reading comprehension difficulties, but for different reasons. In language/learning disability deficits both word recognition and listening comprehension have been observed and hyperlexia is characterized by language and cognitive deficiencies. (Comstock & Kamara)

New readers must firstly learn the alphabetic principle and recognize the words. Recently, researchers have discovered that phonemic awareness training is necessary but not a sufficient condition for learning to read. The ability to read depends on rapid and automatic recognition and decoding of single words, which is dependent on the ability to turn words and syllables into phonemes. It is important for teachers to understand that phonemic awareness has been

proven to be a very powerful predictor of later reading achievement. Olson and Wise (2006) claimed that programs designed for training phonological awareness would generally be successful; some of them are more beneficial to students than others. (Kazakou, Soulis, Morfidi, & Mikropoulos, 2011) A student reads fluently when he reads almost automatically, especially those words which are common in everyday life. This requires three procedures: visual processing, phoneme recognition and word interpretation. During the reading process the visual and auditory systems have to work together, in other words to be synchronized. When a child starts to learn to read, the letter (grapheme) the child sees corresponds to what the child hears (phoneme). In reality, some regions in the brain activated when people start reading. (Sousa, 2007)

According to Greek literature, teacher can identify reading problems in students with difficulties, when is difficult for them to follow reading process line by line, they cannot recognize words or letters, they read slowly without "coloring" their voice and when they cannot follow the punctuation. (Μουζάκη, 2008)

Physical factors include speech, hearing, and visual impairments. Problems with certain neural systems can cause reading difficulties. In some occasions, problems appear during the early stages of brain development and affect the ability of processing the sounds of language and eventually decoding written text. (Sousa, 2007) Less common problems with reading can be caused by impairments in hearing and in vision, which may arise at any time of life. Students with specific reading difficulty have reading skills that fall below the lower. In addition, spoken language difficulties could consequently be indications of potential reading problems. Many studies have shown a close connection between preschool problems and difficulties in spoken language and reading disabilities during school years. (Silliman, 2002) Furthermore, children who come from risk families (illiterate poor families) and are classified as dyslexic had certain difficulties, including phonological awareness, vocabulary and grammatical expression, during the early years of their lives. Many students come from lower socioeconomic groups with underdeveloped phonological awareness. When those students come to school age they may consequently belong to a disadvantaged group, because of their background. (Muter, 2003)

Research has documented that the students who are at risk for reading difficulties because of weaknesses in the phonological component of their natural capacity for language, are poor readers. They experiences a "bottleneck" to reading growth primarily because of early

difficulties in acquiring accurate and fluent phonemic decoding skills (Torgesen J. , 1999). Those difficulties, in turn, have a serious impact on the development of reading fluency and reading comprehension. Students with these types of primary reading difficulties are currently labelled dyslexic. The phonological weaknesses of these students create reading difficulties for them in spite of supportive home environments or adequate general intelligence. Without appropriate reading instruction in school, the vast majority of these students are destined to suffer serious academic problems because of their reading difficulties.

The existing literature has shown that students with reading difficulties, experience high levels of congestion in the process of reading text because they cannot decode so easily the text as other students (Torgesen J. , 1999)the reading difficulties have serious consequences in the evolution of these students since they have difficulty understanding the written word. These students need specialized support as they face significant problems in their academic development.

The positive is that reading difficulties can be addressed when the problem is at an early stage. This is demonstrated by several studies as that of Torgesen (2004)according to which the possibility of limiting the problem is between 1.6 and 6% of the total population. Similarly Mathes, et al., (2005) reports addressing failure rate of reading problems in less than one percent. Scammaca, Vaughn, Roberts, and Wanzek (2007)argue with the above indicating that there are common practices that could be used in treating early reading difficulties such as the existence of clear phonological awareness and decoding instructions.Fortunately, recent research has also demonstrated that it is possible to prevent the emergence of early word-level reading difficulties in many students with phonologically based reading difficulties. For example, (Torgesen JKIn: McCardle P, 2004)concluded that, if effective interventions such as those reported in recent research were generally available to all students who needed them, the incidence of early reading difficulties could be reduced to between 1.6 and 6% of the total population. A more recent study that provided powerful interventions to a mixed group of students “at risk” for reading difficulties (Mathes, 2005) reported an estimated population failure rate of less than one percent if the most effective intervention in that study were made available to any student who needed it.

A recent examination of 12 studies that each provided 100 or more sessions of preventive instruction at some point during kindergarten or first grade showed that a variety of different approaches could be successful in accelerating early reading development in “at risk” students



(Scammaca, Vaughn, Roberts, & Wanzek, 2007) However, all the successful interventions did have some things in common, including provision of explicit instruction in phonemic awareness and phonemic decoding, along with practice reading text and comprehension instruction.

At this point it is important to be noted that such is mentioned by (Perfetti, 2003), that language is directly linked to the process of reading or else is a key element of this. In particular, the development of reading is directly related to the language and skills of an individual have been proven by studies (Stanovich, 2000). The strong relationship stems from the fact that both (language and reading) are designed to achieve effective communication. The relationship starts to develop from (Perfetti, 2003) the birth of a human being and progresses during the whole lifetime.

Also the importance of the oral language in order to read shows that the deficiencies in verbal language eventually lead problems in reading (Wolf & Bowers, 1999) Despite the similarities between spoken language and reading, there are significant differences. The main difference is that learning the language is a simple and automatic process. The understanding of the reading process is also a very important which is influenced by various factors such as linguistic, social, cultural, etc. It is also stressed and the importance of individual elements of language such as morphology and semantics, determine the effectiveness of reading. This stems from the fact that the reading process is cognitive process. Accordingly graphical situations offer meaning and facilitate the whole reading process (Perfetti, 2003).

### **2.5.2 Dyslexia and Writing Difficulties**

It is widely known that dyslexia is a difficulty in reading process that appears through families. (Snowling, 2000) Therefore, it is a difficulty that inherited. Dyslexia is a specific language disorder, a learning disability, which can also co-occur with other disabilities. It also encompasses spelling and writing problems. (Sousa, 2007) Difficulty in word decoding, which reflects phonological processing abilities, causes a slow verbal processing speed and verbal short memory limitation. (Snowling, 2000) Moreover, dyslexia can be defined as a problem to recognize printed words at any age (Hulme & Snowling, 2009). Until recently, dyslexia was a term that meant exclusion. Dyslexia is frequently defined as a difficulty in learning to read without the existence of low IQ. (Simmons & Singleton, 2000) A dyslexic brain functions differently from a brain without dyslexia (Kirk, Gallagher, Coleman, &

Anastasiow, 2012) A human brain can be divided into 2 hemispheres connected by corpus callosum. The left hemisphere is specialized in the language. Dyslexia is not just a reading disorder-it is also a writing disorder, since spelling problems occur while producing written competition. The majority of poor readers are poor spellers with bad handwriting as well.

According to the following definition it is clear that: 1. dyslexia is neurological in nature and 2. A learner with dyslexia appears to have difficulties in the following areas: phonological awareness, fluency in word recognition and consequently this also leads to reduced comprehension. In this research, it will be discussed only reading and writing difficulty. Writing is a highly complex way of communication but more simple than reading. It requires a combination of neural networks and systems. Writing is a process that guides students to start participating actively in learning process (PytlikZilig, Bodvarsson, & Bruning, 2005). Writing consists of including spoken word into written word or whole sentences. Writing skill requires a combination of muscle movements in order to achieve to representation of the language sounds (Bakir & Adas, 2013). The process of writing integrates visual, motor and conceptual abilities. In Greek schools, writing instructions start at Kindergarten (unofficially) or officially at the first grade.

Writing instructions begin by focusing on holding the writing tool, forming manuscript and cursive letters correctly. Teachers can understand that which students struggle with writing when they avoid or they express their dislike, when they have poor spelling and when they reverse letters or words (Kirk, Gallagher, Coleman, & Anastasiow, 2012). Teachers should know that writing process is not a survival skill as spoken language. Writing slows down the process of dealing with text (reading), proving children with sufficient time to recognize the combination between sounds and letters (Jennings, Lerner, & Caldwell, 2011). Asmervik, Ogden & Rygvold (1999)describe writing difficulty as a difficulty for the student when writing. Writing difficulty can be consisted of poor handwriting, capitalization and grammar punctuation. Many handwriting difficulties come from motor problems, faulty visual perception of letters and words, poor visual memory, poor motivation and limited spatial judgment (Mercer, Mercer, & Pullen, 2011) . Skin muscles, tendons and joints are some other possible areas that problems can be caused.

It was a tendency in the previous national curriculum to teach students to write sentences but that was really hard for slow learners, since they first try to think the sentence and then they write it down. All of these years, writing had been taught in tough way. As consequence

students feared of wrong spellings, bad grammar and bad handwriting. Writing became a stressful activity with no interest (Sousa, 2007).

However, it has to be highlight that it is normal for a 9 years old student to have problems as an example with spacing. When such errors continue existing for a long time and the bad handwriting stays, then a writing problem exists. Dysgraphia is a difficulty with handwriting and spelling. It can occur alone or with many other disorders, such as dyslexia, attention-deficit hyperactivity disorder, auditory processing disorders and sequencing problems. Not only students with dysgraphia, but also the ones with dyslexia have writing problems. Dysgraphia is a neurological disorder, and it can be classified in three types

- Dyslexic Dysgraphia (the inability to transform into phoneme to grapheme results in poorly written text)
- Motor Dysgraphia (problems with hands', wrists' and fingers' muscles control. Result in poor handwriting, drawing and copying)
- Spatial Dysgraphia (spatial processing functions of the brain's right hemisphere cause poor text) (Hooten, 2009)

Gender differences occur in writing but not in reading process. Boys are facing more difficulties in handwriting, spelling and executive functions for self regulations (V.Berninger&B.Wolf, 2009), whereas they are faster in writing speeds than the girls. (Graham, Berninger, Weintraub, & Shafer, 1998)

## **2.6 Reading via computer**

The use of computers in the reading process appeared around mid-1960s with the work of Suppes, Atkinson, and their colleagues. For example, Atkinson and Hansen (1966) published the first report regarding the use of computers in teaching reading. Many studies have shown the computer's effectiveness in teaching reading decoding. A study in the Netherlands (Reitsma & Wesseling, 1998) noted that those primary school students who received phonemic awareness instruction, via software application from both the teacher and the computer, improved this skill much more than those students who worked only with the teacher. In this area, computer can be an important and effective tool (Lewin, 2000). In order to be effective for students with reading difficulties, programs that based on computers have to include:

- Interaction between computer and student
- Emphasize words read by the announcer
- Control on the part of the students difficulties
- Live images and sounds

As soon as the above included in programs, students will understand the connection between sounds and graphics (Hasselbring & Glaser, 2000) and they will acquire the reading process faster.

## 2.7 Writing via computer

According to data elicited from the literature, it has been observed that students with difficulties in writing process do not like writing, (Samara, 2003) because they have to combine context with syntax, grammar and spelling. The result on the paper does usually not represent students' actual abilities (Crivelli, 2000). To use a computer for writing can be helpful. Firstly, because the student can concentrate on a small piece of work at a time (Thomson & Watkins, 1998) and secondly, because it is easier for a student, who does not recognize the letters correctly, to find the right letter on the keyboard. Students have to recall from memory but it is also easier for them when they see the letter first. (McKeown S. 2000). Also the final written text tends to be neater and more legible than a handwritten text. (MacArthur, 1998, Spring). Writing process is usually more efficient for students because they can easily correct their writing and spelling errors. (Margalit & Roth, 1989)

For students with more severe writing difficulties, there are programs that can predict the word that follows and there are also programs called "banks words". Such programs can be proved very useful; since they help the student to express more complete thoughts without leaving gaps or half words (BECTa, October 2001b). Another equally useful tool is the text editor. Many claim that students who use programs like those do not learn spelling. However, those programs offer great autonomy (Detheridge, 1996) while at the same time improve spelling abilities. It is important to be mentioned that traditional correctors cannot predict all 'dyslexic mistakes' (Thomson & Watkins, 1998). However, they can recognize mistakes and indicate the words which need to be corrected to the student. Another tool that can be really helpful is Thesaurus, which gives synonyms and can enhance the understanding of new words

by relating them with already known words (Detheridge, 1996). Moreover, computers form a multi-sensory learning environment, because the students see the word, listen to it and then write it (Crivelli, 2000). Typing a word seems to be useful as well, because firstly students practice exemplary movements of the fingers, which help remembering the correct spelling, and secondly it contributes to their understanding of the connection between sound and letter.

## **2.8 Software for Teaching Reading and Writing Skills**

Recently, in the context of new technologies, it is observed that the interface of students with appropriate educational software develop effective meta-cognitive skills (Kirsh, 2004). Modern computers' software capabilities, especially software with text-to-speech capabilities and graphical representations, have lately enriched the teaching process of teaching reading skills and letter names to students with difficulties (Lovell & Phillips, 2009). Modern software programs have been introduced in order to teach writing or practice writing skills. Nowadays, this software can be adapted by mobile devices, such as video cameras, tablet PCs and smart phones.

The most powerful application of the computer for a child with writing difficulties is the word processing. Research has shown that when a child with writing difficulties is allowed to use a computer, he produces more written work. It is believed that the best conditions for learning are found where active learning takes place; an example of active learning can be teaching through computers (Yelland J. N., 2007). Computers, touch screens or typewriters can be a solution and a helpful tool for children who have severe problems. For students who have writing difficulties, word processing programmes and typing facilities are standard alternative methods for teaching writing. However, it should be noticed that typing and keyboarding take more time than handwriting skills and keyboarding skills come at least 2 years later than writing with pen. (Preminger, Weiss, & Weintraub)

Instructional games in reading, such as vowel spinner and clothespin wheel, can be used in order to teach reading. Much work is required to help a child to improve his spoken language skills and make him aware of it, because of its significance to the child's later acquisition of literacy. Unfortunately, this does not happen as teachers tend to follow the national curriculum. There are many studies which show that the greater a child's awareness of the stipulated phonological structure of words before reading instruction is, the greater the child's success in learning how to read is (Snowling, 2000).

Nonetheless, the earlier the problem is detected the better the chances of intervention. The younger the child is the more effective the remedial intervention is. A good nursery school education should help a child with certain underlying problems/difficulties in reading. Computers' applications have been noticed to have a positive impact on oral and written language. Several studies provide converging evidence that computer based reading intervention can enhance children's decoding and comprehension skill (Kazakou, Soulis, Morfidi, & Mikropoulos, 2011). It has been proven that computer based training has the same efficacy as traditional training. Nevertheless, it has to be mentioned that the latter approach is time consuming (Kazakou, Soulis, Morfidi, & Mikropoulos, 2011). Computers can be tools for early intervention. Thus, they are beneficial when integrated with reading and writing instruction in classrooms.

Gabinger has stated that new technologies can support rich environments for active learning (Grabinger & Dunlap, 1996). Past researches on technology integration had focused on incorporating computers into traditional teaching methods (Legacy, 2008). Teachers and educators know now that it is no longer enough to place a computer at the corner of the classroom and claim that students use technology. Researchers begin to look for new ways in which technology may change basic teaching and learning processes with better addressed expectations for what students should learn, moving away from simply investigating whether the students have higher test scores with computer based instruction (Legacy, 2008).

## **2.9 Teaching Strategies in Classroom**

Strategies are techniques, principles or rules which facilitate the acquisition, the operation, the integration of information in other contexts and situations (Alley & Deshler, 1979). It rules wider application used to organize a series of cognitive actions. Strategies are tools or techniques that they are used to help people to understand, learn and teach new skills. These new skills and hardware can be recalled later (Sturomski, 1997). Cognitive change occurs by changing the existing strategies and the generalization to new problems. With the term strategies, teachers mean all the approaches that may be used in order to engage students in the learning process. These strategies guided teacher's instruction as they work to meet specific learning objectives. Effective instructional strategies meet all learning styles and development needs of the learners. They are plenty of them and teacher can choose whichever strategy is suitable to the teaching method they use.

### **2.9.1 Teachers' teamwork during the reading and writing lessons**

Teamwork among teachers during the teaching process can be an effective teaching and learning strategy which encourages the team spirit. By team work, teachers can exchange strategies and ideas, discuss the methods that are used and suggest new innovative practices. Teachers can combine methods in order to plan the teaching process and compose individual activities for particular skills (O'Connor & Vadasy, 2011). Many schools in Norway use teamwork teaching in classrooms. Students can advise one another on how to respond to everyday tasks of assisting learners with reading and writing problem. Having more than one teacher in the classroom can provide only positive results. Co-operation is a useful lesson for the students. They mimic a situation and they learn to work as a team by helping each other. They will also learn that every person can draw knowledge from another person according to the ZPD (Vygotsky, 1978). Unfortunately, this is not yet available in Greece because of the high cost. However, the Teachers' Association has applied for that several times.

### **2.9.2 Strategies In Teaching Reading**

The way teachers act in the classroom, depends on the resources available to them. In order to create a friendly environment for all students in the classroom, teachers adapt teaching strategies/techniques. Teachers in inclusive classes who have students with reading difficulties adapt some strategies in order to fulfill their expectations at the reading field. A quiet area for reading activities is required for students who are struggling with the lack of that skill (Παντελιάδου & Αντωνίου, 2008). Teachers use books with large print and big spaces between the lines, in order to practice in using both visual and auditory senses when reading text or they use a computer in order to increase the size of the letters. Every teacher has to let the students read new stories and reread old stories every day, in order to build up their fluency by providing high interest reading selections whenever possible (Unesco, 2004). Teachers used to use cards to help students to read words. Teachers show cards to the child after they have read the word and the child tries to remember it. In contrast to good readers, poor readers have substantial difficulty in developing this alphabetic principle. Reading support tools, story boards and reading games which contain stories read by the computer, animations and sounds produced by touching the screen, will support reading process. Research on computer based talking books suggests that enjoyment and motivation may be the greatest gains.

### **2.9.3 Strategies In Teaching Writing**

Teachers use two main strategies while teaching students writing. Cognitive strategy Instruction in Writing and Self-Regulated Strategy Development are the main strategies that the used in Greece. Teachers try integrating writing activities (holding, drawing, dressing skills) and themes across the curriculum and they use reading to support writing development. Although all the technological staff and tools provide a diverse array of options, it is crucial to have in mind that they do not make writing instruction superfluous. Teachers should train students with finger painting and modelling activities; squeezing clay is one of them in order to strengthen hands' and fingers' muscles. To be specific, if a teacher wants to develop an effective programme, he has to think and schedule activities that direct their attention to sounds in the word and then to explain the relationship between letter and sounds. Writing is a language skill not only a motor skill. It is very important to integrate segmentation and blending activities with instructions. Teachers also have to introduce words with simple



consonants before teaching the most difficult of them. Last but not least, teacher should have clearly understood clear the aim of the training programme in order to develop it with relation to reading process and be flexible and innovative while implementing the programme to the people who need it (Muter, 2003). There are many games that a teacher can use in order to check early intervention; memory games, alphabet books, and count sounds, delete phonemes from a word or reading nonsense words that contain important sound symbol relationships can be some of them (Jennings, Lerner, & Caldwell, 2011). In the intervention program, teachers should include in the intervention programme letter knowledge assessing, phonological awareness, vocabulary tests, narrative and listening exercises.

In case a teacher has students with writing difficulties in the class, he should adapt different strategies. First of all, the teacher should allow the use of audio recorder in class. Secondly, he should provide notes or outlines to reduce the amount of writing. Every student struggling with the writing process should use a laptop or tablet for writing assignments, provided that the computer is equipped with spell checker, grammar, and cut and paste features. For written assignments, teacher could provide alternatives for instance video or audio recording. Teachers should make shorter the writing assignments and they should give extra time to those students. They could, as well, allow the use of abbreviations in writing assignments and let student keep a list of appropriate abbreviations. Furthermore, teachers can use mnemonic devices to teach writing process (Capitalization, Organization, Punctuation, and Spelling) (Saskatchewan Learning, 2004).

## **2.10 Summary**

New technologies and specifically computers, offer the opportunity for more effective education for students with difficulties in writing and reading. The preceding literature review revealed that computers offer new opportunities for students with difficulties by offering them the opportunity to join the various social subsets and thereby become active members who have gone through effective education process. Computers are also source of much information but also an instrument to facilitate student in terms of access to this information. Thus through new technologies all students have equal opportunities for development in areas of life and especially for socialization and development.



# 3 Methodology

## 3.1 Research Approach and Design

Which approach was better for my research? There are different approaches of designing a research. In this study I will use qualitative design. Opinions, experiences, emotions, behaviors, etc are examples of qualitative approach. (Strauss & Corbin, 1990) (Maxwell J. A., 1992) The research aimed to interview teachers who use computers to teach reading and writing to students with difficulties in ordinary classes. Data was collected by interviewing 4 informants who teach at the same grade by interviewing them. "Qualitative interviews are face-to-face interviews with the participants that elicit views and opinions from the participants" (Creswell, 2009) Qualitative research means to understand the meaning of what an individual claims during the interview, according to Creswell. Qualitative research design is a research method used extensively by scientists and researchers studying human behavior and habits.

Qualitative research is especially effective in obtaining specific information about opinions, behaviors, and social contexts of particular populations (Bernard, 2006). Qualitative research, briefly defined, means "any kind of research that produces findings not arrived at by means of statistical procedures or other means of quantification" (Strauss & Corbin, 1990) and instead, the kind of research that produces findings arrived from real-world settings where the "phenomenon of interest unfold naturally" (Patton, 2002).

Interviewing people under real conditions is challenging and time consuming and requests researchers themselves to clarify and define what things mean, and rely on the intellectual abilities of researchers to organize, analyze and interpret data. Informants in this study need to feel free to answer in their working environment, in schools. This approach provides a chance to get close enough to teachers, so as to capture what really happens (Patton, 2002).

One difficulty with qualitative study is that it often generates a huge amount of data. Miles (Miles, 2006) has described qualitative research as 'attractive nuisance' because of its attractiveness and simultaneously, its difficulty on finding analytic paths through that richness. I used open semi structure interviews. This approach facilitates interesting interviews and a lot of information that derives from the teacher by open questioning.

## **3.2 Research Method and Instrument of Investigation**

In Qualitative research, the researcher has to announce and to make clear the scope of the study. I announced to all informants the aim of the study by giving them a “request” in order to participate in my study where I informed them for their right to quit if they do not want to continue the research. Each interview started with this short introduction. Connolly (2007) argues that respondents may hide some serious information for fear of being identified so I made it clear that I will keep the anonymity.

Interview method helps the researcher to acquire data and to ask for more details about a fact that is not answered properly. I used an interview guide but as open semi structure interview question came up during the interview. What Creswell (2009) pointed out is that if the interviewee is not clear, additional explanation can be given by the interviewer and that some non-verbal actions from the participant could give information about the issues being discussed; for instance, shaking head in agreement/disagreement. Open questions in interviews provide the freedom that the participants need in order to fully express their viewpoints and experiences. (Turner D. , 2010) Informants had the freedom to express their ideas and opinions about the topic we discussed.

## **3.3 Semi structured interview**

“There is a growing tendency using semi-structured and unstructured interviewing, since they are claimed to be by far the best method of in-depth interviews, that is the qualitative interviews” (Bryman, 2008). Semi structured interview requires to develop an interview guide, which will have a list of questions and specific topics that need to be covered. As I mentioned before I had organized my main questions at the interview guide. Many questions were created during the interview. “Questions that are not included in the guide may be asked as the interviewer is grasped by the things said by the interviewees” (Bryman, 2008). A one hour interview can generate 20 to 25 pages of single spaced text (Kvale, 1996). The interviewer is responsible for how rich the data he collects is going to be, depending on the questions that are used. Because of the amount of data I recorded the interviews and also I

kept notes during them. Every interviewee is asked questions and gets answer sessions. My interviews lasted at least 30 minutes per person and it took me about 3 weeks to perform them. Interviews are a time-consuming form of data collection. To gather data from one person requires first of all preparation, secondly time to conduct the interview and of course time to transcript notes compiled during the interviews. While I was interviewing the participants, I was recording the conversation and simultaneously taking notes on my notebook because of the amount of data, since I had only one chance to conduct the interview with them.

Questions also in my research did not follow exactly the way they were originally outlined on the schedule (Turner D. W., 2010). Sometimes it was asked questions that they were not scheduled. The interview guide had 6 main questions and some sub question about the topic. This is one of the interviewing techniques used in qualitative data collection. This makes the technique flexible. Furthermore, that instrument allows asking more questions for a topic that has not been fulfilled (Barriball & While, 1994). Researcher should then analyze the information according to the topics as answered by the interviewee (Laforest, 2009).

### **Pilot test in Interview guide**

One of the most significant elementary advantages of the interview is the implementation of a pilot test. Using pilot test before the main research helped me to avoid flaws and limitations or other weaknesses and at the same time allowed me to make necessary revisions as Kvale mention ( 1996). By using a pilot test, a researcher tests whether the participant has similar interests with the other participants in the study. I used the pilot test in order to check my interview guide. One of the participants was a retired teacher, who retired a year ago and had worked for years in inclusive classrooms. He understood all the questions and as a result he helped me to form more specific questions concerning the use of computers. Pilot studies are widely used as pre-test and as an instrument to ensure the validity and reliability of the question guide (Baker, 1994).

## **3.4 Population and Sampling**

**Area of study-**This research was conducted with the contribution of 4 different primary school teachers from Greece (3 coming from Athens and 1 from Thessaloniki).

### 3.4.1 General Information about Teachers' Background

My aim was to interview teachers from one of the biggest private school in Athens, because they use computer devices to a greater extent and are better educated on the field of reading and writing problems and computer technology services in teaching process. Unfortunately, I encountered a lot of problems in finding participants. The administration of the school did not give me permission to do the research. As a consequence, I decided to interview teachers from primary public schools, who work in ordinary classes without having any help from a special needs educator. Four people accepted to participate in this research; all of them are teachers in primary level schools in ordinary classrooms in Greece. All of the participants have academic degrees and extra studies on the field of special needs. One of them has 25 years experience in classes, the other have 15, 7 and 5 years of experience. Three of the participants were interviewed face to face and the fourth via email, because the teacher I intended to interview lives in North Greece (Thessaloniki), far away from the place I made the research. However small this number may seem, it provided an amount of rich data and information through transcribed interviews. (Maxwell J. A., 2005) (Creswell J. W., 2014)

Figure 2: Information for informants

Participants	Specialty	Years of Experience	Model of interview
Sin	Primary Teacher and Psychologist	7	Face to face
Son	Primary teacher, Student at master of Special Needs Education in Athens	5*Experimental School	Face to face
San	Primary Teacher, Integrated class	25	Face to Face
Sen	Primary teacher, Special Needs Educator	15	Via email

### 3.4.2 Sampling

In qualitative studies, samples are typically small (Maxwell, 2005). It is difficult to know how many people will be interviewed before theoretical saturation has been achieved. Sampling is

referred to the amount of the participants that every study has. I used purposeful criterion in order to choose the sampling, because it provides the researcher the freedom to make changes during the process of collecting data. In qualitative research is really important to have chosen a sample that helps the researcher to analyze data by their responses. “Purposeful sampling can make progress in the validity of the findings (Gall, Gall, & Borg, 2007). I used some criteria in order to achieve the validity of my sample. (Palys, 2008) In purposive sampling, sample is with a purpose in mind. One of the first things with this kind of sample is to verify that the respondent does in fact meet the criteria for being in the sample for this study.

Purposive sampling is very useful for this situation because i wanted a targeted sample with an educational background on field of special needs. With a purposive sample, researcher is likely to get the opinions of this specific population, I chose to interview teachers from different schools. The plan was to interview teachers from a specific private school, because the school gets higher subsidies, and teachers use the latest technology in the classrooms. Unfortunately, the headmaster did not answer to my messages. So, I was obliged to change my initial plan and tried to find teachers from public schools. The teacher, who helped me piloting the interview guide, introduced me to 2 teachers, who fulfilled the prerequisites that listed below.

The criteria for selecting the teachers who participated in the study were many. All the teachers should be qualified as teachers from Universities. First of all, they should work in ordinary classrooms without any assistance from special needs educator- really few special needs educators in each school. Secondly, they should have students, who cope with reading and writing difficulties. The third criterion was to have knowledge about special needs education and computers because the topic of the research is that, so participants had to be educated about that topic. They all had studies in special needs education field.

In addition, teachers were between 25 and 50 years old and have teaching experience from 5 to 25 years. At this point, I would like to point out that age was not one of my criteria. Teachers’ age and gender was random. I strongly believe that it was not obstacle conducting the research since a wide age range was covered. Four ordinary primary school teachers were finally selected for this inquiry. Gall, (Gall, Gall, & Borg, 2007), states that the purpose of selecting a case is to acquire in-depth information of the phenomenon under study. The sample consisted of 4 female teachers who live in Athens and one more living in Thessaloniki. Thus, the interview with the last mentioned was conducted via email. Two of

the participants were recommended by the headmaster of a school, whom I met in order to ask for the permission to carry out the research. A huge disadvantage of the email interview is that it lacks the physical contact with the interviewees.

### **3.5 Data Analysis**

Data analysis starts as soon as data have been collected (Bryman, 2001). The analysis of qualitative research notes begins, while the researcher identifies concepts that appear likely during the research. Not all of the information was useful and therefore only some parts will be used (Creswell J. W., 2014). When I was ready with collecting my data I wrote word by word the interviews directly from the recorder. Simple reading of the notes or transcripts is an important step in the analytic process. I made frequent notes to identify important statements and to propose ways of coding the data. The data from a qualitative study most often are notes that the researcher keeps in the field or the whole interview which has been recorded. (Bryman, 2008).

For the analysis of the qualitative data i used thematic analysis to explore teachers' views in depth. The aim was to investigate new ideas, views and proposals and the analysis was made by comparing the statements of the participants but also through appropriate themes that arose from the data. Braun and Clarke describe an analysis as thematic analysis when it is specific theme centered. The next step in thematic analysis was to generate initial codes from the data. Codes are words or sentences that are related to the data. This step begins after the researcher has become familiar with the data and knows what it is important for the study (Braun & Clarke, 2006). The first analytic step in thematic analysis is that the data needs to be organized into meaningful groups (Braun & Clarke, 2006). For this study, line-by-line coding is chosen. Line-by-line coding gives at least one code to each phrase, line or sentence in the data set. This process requires detailed attention to each line, thus capturing every detail in the transcripts. Notes were taken in the text, and segments of data were identified using different colors of highlighters, as suggested by Braun and Clarke.

As a thematic analysis is defined the set of events or situations that are presented in relation to the question raised by the researcher and that is the horizon in front of which the main points of the individual's life are raised (Gurwitsch, 1966). In thematic analysis the researcher collects the data and after that, he codes it in order to create themes. Especially, with the



process called ‘sequentialization’ researcher, follows events as presented by the narrator and records the changing issues and the discourse used: a) argumentation - growth argument or theory to describe options or events that happened in the past through today’s perspective b) “description” - the assumption that some elements have specific properties which are not related with time or historical events c) “evaluation” - featuring events and situations in the past with today’s experience d) “report” - summary of events and situations e) “narration” detailed presentation of events and situations. The researcher first selects the main theme with which starts the narrator and notes the media changes that are presented, the way in which he present them as well as their duration (Gurwitsch, 1966) . When data is coded for first time, it has to be coded again and forced to be more and more abstract codes until they represent a theme. One of the main advantages of this type of analysis is its freedom which allows the researcher to create the themes that he wants to discuss (Braun & Clarke, 2006)

Based on the above, after the primary coding, codes were placed into larger families by organizing those which had similar meaning. However, the next step in the analysis was to create themes. That was one of the most difficult parts during the analysis and also it is one great limitation for thematic analysis, because authors are not specific on how researcher creates themes out of codes. A potential limitation of thematic analysis is that the methodology is insufficient (Braun & Clarke, 2006).

Proceeding to the analysis phase, I started by reading through all the interviews’ notes. In this second stage, I read line-by-line all the notes and I started coding each sentence. I had all the interviews from the four participants and with different pencils I marked the different themes .I had also predefined themes where I strengthened them according to the data. I supported thematic analysis because it gave me freedom to find relationship between themes.

I used inductive and deductive approach. The coding of data happened by trying to fit data into a pre-existing coding frame. The aggregation of data was so evident as to create themes. Nevertheless, I agree that the thematic approach is the most appropriate method of analysis for this study. The inductive approach, or else bottom up way, enables study themes to be connected with the data. A theme represents a strong relation between the data and the research question. Themes would also be driven by the researcher’s theoretical interest in the area based on the interview guide and on the pre-defined themes.

## 3.6 Reliability and Validity

Every researcher should ensure his study by establishing that the data is valid and reliable at the same time (Kvale, 1996). One important step in every research, and also in qualitative research with thematic analysis which I used, is that the ‘themes’ need to be evaluated. Miles & Huberman (1994) said that to validate themes is urgent. Researcher should involve an outside reviewer during this early stage to assure themes. The main purpose of that was to make the themes respectable (Hosmer, 2008). On the other hand, validation must be done at the early stages of the research. Validation is important for the data, as well.

### 3.6.1 Reliability

Reliability is concerned with the question of whether the results of a study are repeatable. (Bryman, 2012) To ensure reliability in qualitative research is crucial. Seale (1999) states that the “trustworthiness of a research lies at the heart of issues which discussed as validity and reliability. Specifically, the term of reliability in qualitative research, was used as “dependability” by Lincoln and Guba. In qualitative research the concept of reliability is not that relevant. Reliability is a concept to evaluate quality in quantitative study with a “purpose of explaining” while quality concept in qualitative study has the purpose of “generating understanding” (Stenbacka, 2001). External reliability it’s a difficult criterion for my qualitative research. And that’s why because there are really few situations in qualitative studies, as in life, which can be replicated in a controlled way. (Richards, 2010)

For instance, in order to establish my study’s trustworthiness, I tested the interview guide, through the pilot study, before I started the main research. The retired teacher participant, who worked as a teacher in inclusive classes, helped into making the research solid. In the main study, well-educated teachers, who work in ordinary classes with students with learning difficulties, were interviewed. Lincoln and Guba (1985) states that: "Since there can be no validity without reliability, a demonstration of the former (validity) is sufficient to establish the latter (reliability)" Patton (2002) states that reliability is a consequence of the validity in a study.

### **3.6.2 Validity**

Many researchers claimed that the term validity is not applicable to qualitative research. (Golafshani, 2003) In Maxwell's «Understanding and Validity» mentions that if a qualitative study cannot produce valid results then everything that based on this study cannot be relied on. (1992) There is not a specific method that can guarantee the validity in qualitative research. (Maxwell J. A., 2005) The quality of a study can be criticized by how well it overcomes threats to validity (Creswell J. W., 2014). The need for some kind of qualifying check or measure for their research is needed. Creswell & Miller (2000) suggest that the validity is affected and is productive by the researcher's perception of validity (Maxwell J. A., 1992). Researcher has to use methods which help him to examine what the research questions have in common. Not all types of validity can be adaptable for each study. The amount of the data was my criterion for the validity; did was what reported as taking place in the group happened? Or did the researchers report what they saw and listened? (Jonhson, 1997) External validity is connected to generalization to a population; by giving detailed description about the data and about what happened. (Maxwell J. A., 2005) The data analyzed on the Chapter 4. Furthermore, as I have already mentioned all the interviews have been recorded and then transcribed. By listening them a lot of times, was avoided the manipulation by the researcher. Internal validity is basically displaying if the study is replicable (Maxwell J. A., 2005) (Creswell J. W., 2014) If another researcher chooses to do the same research again, the same topic, will he sum the same results? External validity is basically generalizability of which the setting, population, and so on, this effect can be generalized, but it isn't so easy with qualitative research (Creswell J. W., 2009) However, it is not a goal in interpretative research how generalizable and replicable a study is.

### **3.6.3 Factors that might have threatened validity and reliability**

“Why should one believe this study” wondering researchers. A qualitative research does not have the advantage of validity as a quantitative research. (Maxwell J. A., 2005) There are few facts that could affect the validity and reliability of this study; For example, poor vocabulary can cause misunderstanding and, as a consequence, I could not be sure whether the meanings were understood by all the participants. The translation from one language to another could cause misunderstandings, too. This may have affected the way the teachers answered some questions. Translating Greek into English can be challenging, since several Greek words can

have multiple definitions and their meaning cannot be translated exactly in other languages. Furthermore, negative influences are low in this study because as a researcher I tried to be neutral while I was interviewing. This gave to the informants the opportunity to answer as much widely and honestly. All the informants answered the questions. Internal generalizability according to Maxwell is “conclusions within the setting or group studied”, while external generalizability is conclusions beyond the setting or group. (Bryman, 2008) The small number of informants (4) in this research doesn't allow generalizing the result on how teachers use computers for students with reading and writing difficulties. Researches maybe will raise in the future similar results and would also boost the external validity /generalizability of this study.

### **3.7 Ethical Considerations during the study**

All the studies that involve humans in general should be granted permission before starting. The University of Oslo granted approval through NSD. Furthermore, approval from the school administrator was needed and from all the informants in order to accept to participate voluntarily. Every research should be technically correct, practically efficient and ethically sound. People should have the willingness to participate in the research. Whoever is involved in a research should have his privacy ensured, since information and private views are going to be used. Before a research begins, participants should be informed that they can quit the study in case they feel uncomfortable during the research and they do not want to continue. I have to mention that the research in the field of education can easily be misunderstood as infringement of the right to privacy and that requires the teachers' voluntary participation, since they reveal sensitive information about their students. Every human being has the right to privacy. Ethical issues are of great significance and they ought to respect the participants in their studies. Researchers need to consider mentally incompetent persons as people with neurotically impairments. Brown states (1993) that the control of personal information is viewed as an expression of autonomy and as an individual right to protect his or her social vulnerability and identity. Privacy can also mean that people expect to be free from intrusion. That means that they do not want any other researchers contacting them, unless they themselves are willing to participate. All the participants should be fully informed about the purpose of the study, how the results are intended to be used and who will have access to the data. Bacon and Olsen (2005) claim that researchers shouldn't waste a responder's time and

have to collect only data needed. Deception is unethical and morally wrong for some researchers. Anonymity and confidentiality are the most obvious issues and we have to assure them that they are not going to be violated. The perception and the fact of confidentiality are important. If respondents are likely to suspect the abuse of confidentiality, it is better to assure them of the anonymity rather than confidentiality. While analyzing the data researchers should determine how the study protects the anonymity of individuals in the research, for example protecting their names replacing them with numbers (Creswell, 2009). At the beginning of the study, researchers should not only explain to the participants who will have access to their data, but also ensure them that unauthorized people will never be able to have access to it, protecting this way the participants' privacy (Borg & Gall, 2007). Researchers need to anticipate the ethical issues that may arise during the studies.

### **3.8 Limitations of the study**

The first limitation I dealt with was that the school I wanted to make my research in, did not give me any permission. That was the greatest difficulty for me, since it took me a long time to find the appropriate teachers for my study according to my criteria. There were several well educated teachers, but they had unfortunately never used a computer to students with learning difficulties. Even when I found the teachers, most of them focused on how children with reading and writing problems are taught in an ordinary class. They had nothing to say about how they could enrich their teaching methods in order to help students who deal with them, to cope with them. There is a huge difference in the way each school and each teacher uses the different kind of technologies and in their attitudes of using new educational software. It's worth mentioning that all the informants were quite upset when we discussed the issue of limited technological devices that school classrooms are equipped with. This could possibly have affected their answers.

Furthermore, in this study, there was limitation the email interview; I had to contact the informant more than once in order to get answers to additional questions. Despite limitations, the email interview was proven costless, and also I tried to contact many times in order to get as additional information as I mentioned. This was achieved by the participant using capital or bold letters every time she wanted to express her strong opinions. Last one more limitation I dealt with was when an informant asked me what he has to answer about the use of computers in classroom.

Another limitation was that I translated from English to Greek and from Greek to English. That means that I might have missed some important words from the transcription of the data. Even though, I used a recorder during the interviews, I encountered difficulties with the translation.

## 4 Presentation of Results

In this chapter is presented the results from the data analysis. This research aimed to find out how school teachers use computer devices to students with reading and writing difficulties. In this chapter also it will be presented the themes from the data. Qualitative studies usually use these themes as headings in the results section. Four themes were created with some subthemes. At the same time is presented quotations and extra supportive information. There is also an extra discussion for each theme.

### 4.1 Themes identified during analysis

In this research, the thematic analysis identifies themes which related to the *use* of computers for students with reading and writing difficulties and themes about the *problems* that teachers face. This thesis will focus on these themes and how they are related to each other. The main research question was “how do teachers use computers in order to teach students with reading and writing difficulties in an ordinary classroom?” This question was stated since reading and writing difficulties are the most common difficulties to meet in ordinary classrooms. The main themes identified after the study and coding of interviews included teachers’ knowledge about 1) the term reading and writing difficulties, 2) problems, 3) computers’ effectiveness, 4) methods and practices that are applied (see Figure below). In the second and third themes arising additional sub-themes and specifically the problems deal with those relating to equipment, educational material and financial support from state, while about the degree of effectiveness of teachers’ training, as well as effectiveness of computers in educational process.

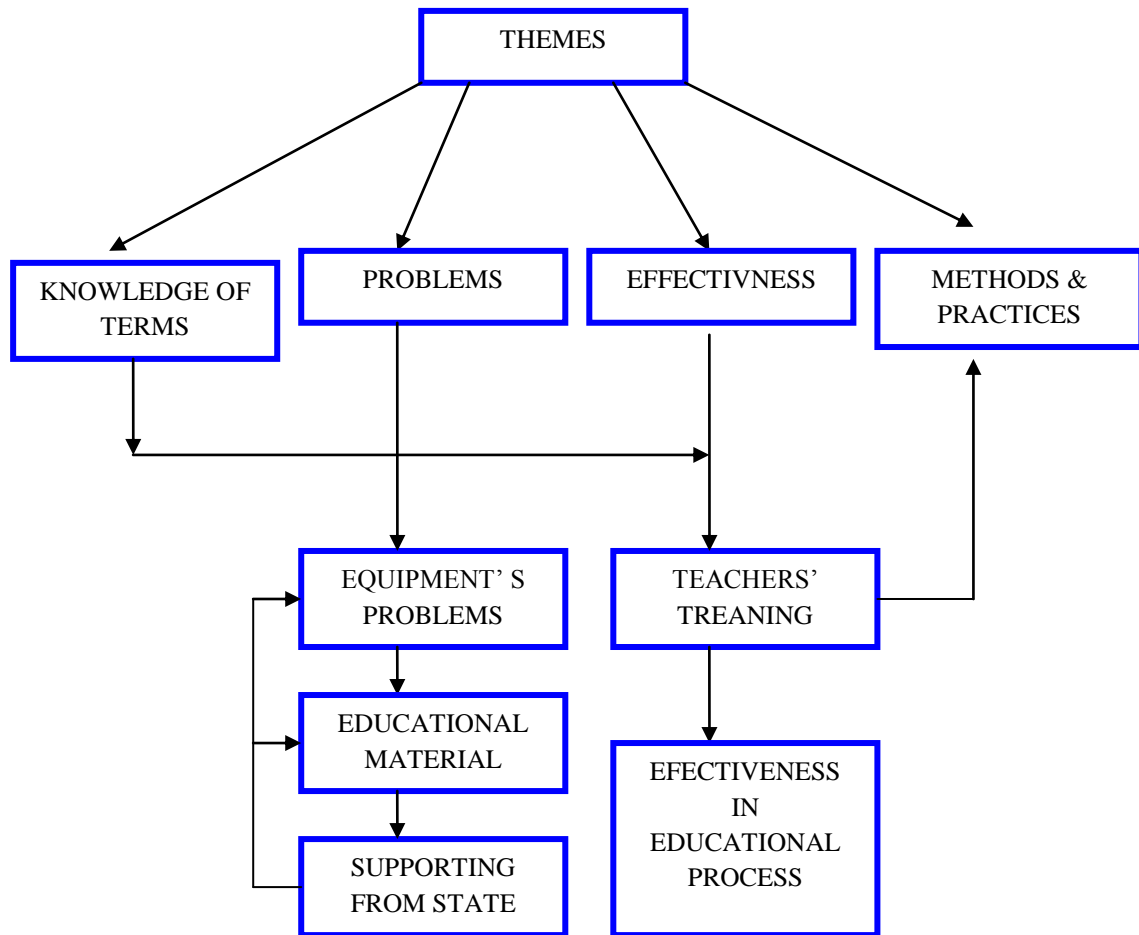


Figure 3 “themes”

Specifically, initially it was conducted a detailed study of all the interviews. During the study all the facts as they are presented by teachers were recorded, with the aim to manifest the main themes arising from the interviews. This was achieved by recording through what teachers describe, argue and evaluate the facts. The results of this recording led to the codification of the major themes arising from the interviews.

The first theme was named “knowledge of terms” and was resulted from the way in which the teachers describe the term “learning difficulties”. The evaluation of the term’s correctness was based on conceptual approaches relating to learning difficulties such as those are presented in the literature. The first theme is connected with the first research question “*How do teachers understand and define reading and writing difficulties?*”



The second theme was named “problems” and stems from the evaluation made by teachers about the current situation in schools and the problems associated with teaching students with learning difficulties. Based on the coding of teachers’ reports three sub – themes were emerged. The first and the second sub themes refers to the problems associated with the equipment and educational material, respectively, while the third concerns to the lack of support from the state. It is noted that actually the third sub theme has a direct impact on the first two, since the poor equipment and educational materials are result of non-support from the state. The second theme connected with the second research question “*What are the problems / obstacles that teachers face in using computers for teaching students with reading and writing difficulties?*”

The third theme is “effectiveness” and it emerged from the evaluation of teachers’ narratives regarding their degree of effectiveness in the learning process of students with learning difficulties. Based on coding two themes were resulted. The first relates to the teachers’ training that directly affects their effectiveness. The second on the other hand, explores the teachers’ view about the effectiveness of computers in the educational process. It is also noted that the first theme “knowledge” and the sub - theme “teachers training” are interrelated. The third theme is connected with the third research question “*To what extent do teachers believe that computers are effective for teaching students with reading and writing difficulties?*”

Finally, the fourth theme was aroused from the description given by teachers concerning the methods and practices in the education of students with learning writing and reading difficulties. It is also noted that the sub - theme “teachers training” and the third “methods and practices” are interrelated. The fourth theme is connected with the fourth research question “*What methods and practices are choosing by teachers when using the computers for teaching students with reading and writing difficulties?*”

## **4.2 Knowledge of the terms about reading and writing difficulties**

The first crucial point which was identified during the coding process was the difficulty that the participants met in giving a specific definition of the terms about reading and writing difficulties. Based on this finding the first theme of the analysis was named “knowledge of terms”.

All the participants are well educated and experienced. Two out to four participants, them with the less experience, had misunderstood the terms. Although informants were asked to give individual attention on defining the terms, at the same time, they got informed about the theory of how reading difficulty is related to decoding and phonemic awareness. (Kirk S. , Gallagher, Coleman, & Anastasiow, 2012) So, the half of the teachers receiving incorrect knowledge and therefore the results were not trustworthy and, unfortunately, of no value. Especially, two informants, Sin and Son stated that *“reading and writing difficulties are common with special educational needs, common or the same with learning disabilities, dyslexia or mental retardation. I do not know if students can overcome those difficulties in their lives”*. Nevertheless, they knew that it is a problem which it does not reveal low IQ. They had to give a specific terminology about those topics. This result indicates the lack of reliable information and the gaps in teacher training on the subject under consideration. This challenges the effectiveness of such teachers in schools. Teachers should be flexible to define those terms and also to know the differences. It must be held, therefore, that teachers based on their own perceptions most of the times. This is also supported by other authors. Indicative, according to Dann (1990) in their daily teaching, teachers make their own ideas for students, teaching approaches and learning outcomes. Therefore highlights the need for investigation and understanding of the representations of teachers in terms of students' learning difficulties. Also there is existed the need for addressing the strategies chosen by teachers and their consequences in their emotional state.

Informant Sen elaborated her answer by saying that *“learning difficulties are the difficulties in the learning process when school performance does not reach the expected levels provided in correspondence with the average age of students. These difficulties tend to be the specific learning difficulties such as dyslexia or Dysgraphia.”* The definition given by that informant agrees with those given in the literature (Scott, 2004) (Watson & Boman, 2005) according to which *a learning difficulty does not affect general intelligence, whereas a learning disability is linked to an overall cognitive impairment*. However, unfortunately, in Greece it's a common mistake to confuse terms such as learning difficulties, and that happens because each professor introduces a new term for each field of difficulties.

According to informant Son, *the specific learning difficulty is neurological condition and innate situation instead of learning difficulties and it may be existed for psychological reasons*. This view is supported in the literature. For example according to Kirk (1972),

children with learning difficulties show an evolutionary heterogeneity in psychological functions, which limits the learning process to such extent so as to need an appropriate training program.

If teachers want to meet the individual needs of students with reading and writing difficulties, they have to understand correctly the nature of difficulty in order to use the appropriate material for the early intervention in an ordinary classroom. The ignorance and the deficiencies of course, as it is manifested, are caused by many factors, because as was mentioned before, a special tutor is not provided by the state for those difficulties. Parents try to help their children to overcome the difficulties by hiring private tutors for parallel support at home or in specialized centers. This is a deficiency of the public educational system; it reduces its reliability and efficiency. At this point, I want to add that there is no evaluation on how teachers do their work. If inclusion is to succeed in the Greek educational system, a different parallel support should be given to teachers and students related to those difficulties.

### **4.3 Technological staff in the classrooms(problems)**

Computers can support and are supporting lots of learning methods. New/modern computer technologies can be the key to social interaction. Technological tools provide support for planning and revising through the use of multimedia application, word processing, spell checkers and speech synthesis, even smart boards, all of which make the text production easier. However, if we exclude the course of informatics and some individual pilot projects, this picture belongs to the distant future for a public school in Greece. Based on the finding presenting below the second theme was named “problems” which means the difficulties that teachers have to deal with because of the lack of them.

All informants claimed that the technological equipment in classrooms is really few and old and in some cases they share them. Informant Sin possesses *“that the school has only 3 computers for 180 students, from which one is located at the reception office and the other two have been donated to it”*. The other school has laptops, but teachers do not use them a lot, because of the objection of some parents who disagreed with the use of computers. Informant Son who is working in experimental school, (That means extra finance in order to use modern teaching methods) although the school has many computers in each class, her leader advised her to change the way of her teaching in order to avoid that situation.

Educational tested computer software is really rare to find. There are certain applications and suitable software for students with impairments, for mental retardation and physical disabilities, but nothing more specific. Teachers meticulously select proper applications from the existing educational software and this is not particularly easy if you don't have the appropriate education. However, teachers are willing to share and design exercises and all claimed that *"support from the state does not exist"*.

From the above is evidenced that there is still a problem in regards equipping schools with computers. It is necessary for schools to meet all the requirements and to have the appropriate and necessary staff to achieve the objectives, computer and network equipment. The ergonomic design and well prepare a learning environment are important factors that determine the degree of achievement of learning objectives. Also, there should be a modern technological infrastructure so that it attracts the students, although it is difficult that the school always has the most modern equipment. Even today, there are schools in which there is no provided room for using school laboratory and in some of these cases there is no place for construction. Tackling this must be done by working out the proper study based on conditions prevailing in each school unit.

#### **4.4 Educational Material(Problems)**

The most interesting topic of all was that all of the participants stated that there are no communication between state and schools concerning the educational material and software that can be used in the classroom. As a matter of fact, there is no software recommended by the state at all. As I have already mentioned, educational system in Greece is very strict. That means that state is responsible for what happens in the school and how it works. For example state decides on books and teachers are obliged to work with them. State recommends also the curriculum. Informant San was surprised when realised that there is no specific material for students with reading and writing difficulties. Informants Sin and Sen *"believe that economic crisis is a really critical factor for public education nowadays. Economic resources are few and nothing innovative is being suggested."* The above problem certainly does not allow teachers to offer services according to their real possibilities. The importance of the educational material is great. According to Keegan (2000) (cited in Lionarakis, Matralis, & Panagiotakopoulos, 1999) the quality of the educational material should be designed in the light of the principle that learning is achieved through student interaction and educational

material. The design of educational material is not a challenge only for authors but empirical and educational challenge for students to draw and edit information through multiple educational tools and technologies of the teaching material in order to promote self-motivated and a dynamic, continuous and communication between educational material, teacher and student. From the above it is revealed that in Greece teaching students with difficulties facing multiple problems, particularly regarding the training materials. The efforts for solving this problem are still sparse. One of these is the instructions for changes in educational curricula based on various programs of the Pedagogical Institute, in collaboration with teachers and academic institutions of the country.

## 4.5 Supporting from the state

A limitation that was identified by all the informants in the present research *was that the state, unfortunately, does not finance new programs and practices*. There are many teachers that individually create software and exercises such as “Ο ξεφτέρης” (which means the smartest), which help student feel familiar with Greek letters and sounds. In Greece, special needs educators and teachers try to create awareness programs and programs for specialized training in extensive research, such as in Denmark, Sweden, and Norway, where very good results in the use of such programs have been achieved. *“Computer represents the last step with a view to enable direct assistance to all difficulties connected with the written language, so as the conversion of the written word into the spoken one to become much easier. Each written symbol is converted into audio from your computer without being dependent on others”* claimed informant Sin. Other research carried out in Greece (Spyropulu, Kontaris, & Antonakaki, 2008) also supported these results, showing that a large proportion of teachers in Greek schools believes that funding by the state is insufficient. This issue deserves serious attention, since as is mentioned by Spyropulu, Kontaris & Antonakaki (2008) funding by state directly affects the quality of the educational process.

The lack of state guidance in that field means that students all over Greece will have a different educational approach for a specific topic and their education depends on teachers’ willingness. Four out of four participants have the ability to use those services and also to create pedagogical software, even though these services and abilities are not often used because of lack of equipment and the lack of extra financing.

## 4.6 Teachers' training

Despite the lack of sufficient funding, teachers claimed that new teachers are creative and well trained on how to design new programs for those difficulties on the computer. For example informant San stated that *“because of the lack of state support many of the teachers design by themselves software and e-exercises for students with disabilities and they share them on educational teachers' forums.”* For that reason, they upload the material that they use on special forums so as other teachers can use it, too.

This result is probably due to the fact that in Greece, a large number of programs in the new technologies are designed and established for the training of teachers, such as the programs “Information Society” (2002-2006), “Education and initial professional Training ”(2006-2008), as well as the project “Training Teachers to Use and Application of ICT in Teaching Practice” (2007-2013). In addition to these programs, in recent years the emphasis is given on distance education and training in order to better and easier service of teachers' training needs. Most distance programs focus on improving teachers' knowledge about issues related to the new technology. (Chatzipanagiotou, 2001)

Studies in Greece highlight that teachers recognize the importance and the usefulness of new technologies for the educational process. However, they do not apply easily new technologies in their daily and additional teachers are adapted difficult adapt to the new conditions (Vosniadou, 2001) (Grammenos, Stavridou, & Dimitriadis, 2002) (Jimoyiannis & Komis, 2006) (Russell, Bebell, O'Dwyer, & O'Connor, 2003). Although no longer in many Greek schools are computers, they are used by the teachers in conventional way and not as a learning tool. In particular, computers are mainly used for finding information as well as for organization of the courses, but not for the design of the learning project. In summary the active learning of students is not supported (Mikropoulos, 2006) (Russell, Bebell, O'Dwyer, & O'Connor, 2003). According to Jimoyiannis & Komis (2007) the limited skills, the lack of experience and the attitudes of teachers towards ICT are the main obstacle.

## 4.7 Computers' effectiveness

Despite the lack of sufficient funding, teachers claimed that new teachers are creative and well trained on how to design new programs for those difficulties on the computer. For that reason, they upload the material that they use on special forums so as other teachers can use

it, too. In addition, computers are a multisensory learning tool and students can listen and then write what they listen to. To type a word seems beneficial, as students learn exemplary movements of the fingers, which help them to remember the correct spelling. By the use of computers children can learn to recognize all letters and their categories: vowels and consonants. There are also touch screens with digital technologies for learning, where students can put their fingers and shaping letters. Thus, students meet in the virtual environment and develop social and communication skills, along with the construction of new knowledge. By the implementation of the program, the child not only has cultivated his technical skills on designing three-dimensional worlds, but also has helped his classmates to develop their own skills. Computer use can include collaborative purposes and can promote the process of socialization.

Informant Sen claimed that a smart board really helps her in order to teach a student how to write. *“It is a means of instruction that helps students to operate actively in order to complete procedures with great pleasure and satisfaction. Students with difficulty in writing are holding the IP pen easier than the computers mouse and they can see what they have written on the screen on the wall. That practice also is a kinetic exercise for firming muscle, because the student has to move a lot since it requires movement in order to write”*. Unfortunately, not all of the schools have a smart board. Only Sin and San have used it at schools.

Another area where computing can greatly assist children is that of reading. According to informant Sen *“the computer is used as a means or as a supporting tool, especially for individualized instruction to children with difficulties. Another barrier associated with the use of computers and tablets and smart equipment is that they are available in few schools. In some cases, teachers bring their own laptops or exchange information with other teachers, as there is no guidance from the ministry in that topic”*. Informants comment that schools in Greece don't follow European practices in education lately. It depends on the teacher and how much he or she will use the devices and for what reason. As Son mentioned, *“because of the lack of state support, many of the teachers design software and e-exercises for students with difficulties without having any support.”* The lack of state guidance in that field means that students all over Greece will have a different educational approach for a specific topic and their education depends on teachers' willingness. Four out of four participants have the ability to use those services and also to create pedagogical software, even though these services and abilities are not often used because of lack of equipment and the lack of extra financing.

Informant Sin states that the technological stuff varies from a school in capital cities and villages. For example *“Even if a school does not have access to computer, it could still not have access to other devices such as electronic dictionaries, combine treasures facilities and speech playback (can read loud words) and scanning pens”*. With that pen (like pens) student can scan a word and then can hear it. *“Taking written notes or copies is a difficult task for students with strong difficulty in writing, so it’s preferable for them to use recording or scanning”* Moreover, San added that *“there are also simple portable word processors that are smaller than a laptop, but they do not have a capacity of speech.”*

## **4.8 An indispensable training tool for Educational Process (effectiveness)**

All participants emphasized on the fact that computers and other technological stuff such as internet, tablets and multimedia, are an essential tool for teaching students with difficulties. *“Students have fun through the use of the computer, and they find it particularly interesting. They learn while they are having fun”*

The teachers supported the view that all teachers should use computer programs in the early intervention process, because many skills associated to reading and writing, such as visual and auditory discrimination, visual-motor coordination, memory, etc, can be obtained by children through appropriate educational software. Furthermore, the use of the appropriate educational software can be an excellent tool for children who already face some difficulties, since it sets small and distinct goals.

For all of the informants the use of the Internet for educational purposes can have great potential as an alternative source of knowledge and information, This result agree with the view of other researchers as Dogruer, Eyyam & Menevis (2011), according to him the Internet provides not only social connection and entertainment, but also academic and scientific information. Also according to the teachers, when Internet comes to students with special difficulties, can be promoted as an additional auxiliary tool, as it gives them extra opportunities to stand equal in a modern world. Internet, this great source of information and knowledge, is not yet completely accessible to people with special educational needs, mainly because it often requires cognitive skills that dyslexic individuals do not have. Teachers encountered other difficulties, as well.



*“We sometimes meet problems with the connection of the devices. For example, there is a lot of time waste waiting for devices to open in the beginning of the lesson. If this loss of time is decreased to minimum, it will be much better as the lesson will be more productive...”* states Son.

The views of informants, who participated in the present research, are recommended also by other authors (Makrakis C. B., 2000) (Raptis & Raptis, 1999) according to whom the new technologies in education help to acquire knowledge on personalized teaching and autonomous and lifelong learning. The technology ensures access to practically all learning difficulties. The technology provides opportunities to promote collaborative learning in school (Raptis & Raptis, 1999) as is proved by the views of teachers. Technology is a powerful tool that can be used to enhance the ability of learning and at the same time to release the student who has learning difficulties. The computer with the appropriate software can help student with learning difficulties to receive education that will give him more options and opportunities in society. So the use of new technologies as found by the answers of the teachers can improve learning ability in children with learning difficulties (Georgogianni, 2000) It is important to note that the views and positions of teachers surveyed are largely based on assumptions and thoughts which they do, and not on the experience of the use of New Technologies. Therefore, it is important to take into account the already formed opinions of teachers, because, as researchers internationally agree (Badura, 1997) (Olson J. , 1995), teachers’ beliefs about the role of technology in education determine to a large degree in teaching and acceptance of the “new” in the educational process.

## **4.9 Methods which are used in teaching students with reading and writing difficulties(methods and practices)**

The final critical point that was identified during the coding process is relating to the methods and practice which are used by teachers in teaching students with reading and writing difficulties. Based on the findings the fourth theme of the analysis which was named “methods and practice” is reviled. San stated *that most of the times she starts the lesson by defining the aims and goals of the new course and by making a short revision of the previous course.* In order to make it easy for the students to recall the knowledge, she uses the power point program to make a short presentation. Participant 1 explains in detail what they are

going to do, which activities and exercises will take place and how much time it's going to last, because she wants to built a good relationship with her students in order to gain their trust. All the participants also stated that during teaching reading, they use team teaching model with dialogues, answers and questions, in order to simultaneously develop other skills. They give praise and acknowledgment when a student read a word properly. Sin divides the students into groups, in order to work with some activities together, and then they tutor the students with difficulties individually. In teaching reading to learners with difficulty, teachers try to get students' attention with a topic of their interests. They use simple text based on their background knowledge and developed on a computer or a tablet. They, also, create properly matched exercises into a file, so as the students can write the words or letters they do not understand. These methods have been used from other surveys (Crivelli V. , 2000) (McKeown, 2000) (Thomson & Watkins, 1998) (Pedler, 2001)

#### **4.9.1 Discuss on methods**

Based on the above, we can see that it is really great significance for teachers to adopt and use methods in the classroom, not only by considering students' strengths and weaknesses, but also their interests. The importance of this method has also been highlighted by other researchers (Singleton, 1994) according to which there are teachers treat use computers as a method of skills' teaching and those who use them as an instrument that gives access to daily lessons. The first category is one that can achieve the desired results. As it was revealed, teachers give special emphasis on students' motivation. Other study, such as that of Crompton & Mann (1996) also highlights the importance of computers in creating motivation for learning. Although students with reading and writing difficulties have almost the same characteristic difficulties, each student with difficulty varies in accordance with his or her background. However, all the teaching methods that are used and the intervention strategies must be characterized by the goal of improvement of individual student. These views are supported by Singleton (1994) according to which the effectiveness of teaching students with learning disabilities through the computer is the degree of differentiation and personalization in processes that is involved. Some student may need more practice through appropriate programs in order to gain one skill; other students may only need to use word to facilitate its participation in the classroom.

Informants 1 and 3 discuss the goals before the start the course. With that method teachers show what their expectations from students are by finishing the course. This method help the students to stay focused on what teacher asks from them.

The use of computer devices, as it is mentioned earlier, helps students with difficulties to be active, self-oriented and motivated. For that reason, all the activities should be organized in a way that serves to keep students focused. These findings are supported in other studies that emphasize the relationship between teaching via computer and learning's motivation (Crompton & Mann, 1996) (Brooks, 1997) increasing of self-esteem (Crompton & Mann, 1996) autonomy (Detheridge, 1996) as well as personalized learning (Rooms, 2000) As a conclusion of the discussion above derives that teachers should have a theoretical knowledge about teaching methods for reading and writing. Teacher should alterate and combine different methods of teaching, because by using only one method, a reading and writing problem is easy to appear. Multi-sensory method is the most effective for teaching all students, especially those with difficulties, because it activates their brains to accept more knowledge. Participants strongly claimed that students with reading and writing difficulties need individual teaching in the classroom based on the thoughts of inclusive class, in order to be part of the class and not excluded from this classrooms' social system. These results agree with the research of according to whom the personalized learning is necessary in teaching students with difficulties in reading and writing. (Rooms, 2000)

## **4.10 Practices that used while teaching students with reading and writing problems**

There are various materials that can be used during a teaching process oriented towards students with reading and writing difficulties. The question was how teachers are using computers or other technological material. Informant 1 reported that she uses specific sounds and music in a smaller classroom and by showing word at the computer students start to count the syllables. The importance of the music in teaching students with learning difficulties is reported in other surveys which have proved that the music can increase the performance of these students. Informant Sen and San stated that they use the computer to help students with how to read by dividing words into letters and vice versa. The use of computer seems to be an

effective teaching technique to assist teachers on giving support to children with reading and writing difficulties. This is supported also by other researchers (Brooks, 1997) (Crompton & Mann, 1996). Informant Sen said that she uses 3 programs Word Construction, Set, Anagram. She added *“Word Construction is an appropriate tool for school grades of students in primary level or early high school. It’s quite sophisticated and difficult to understand it many times. It has many lexical exercises by building words or giving the first letter or divide words into syllables with the aim to produce the desired word;”* and continued *“Another program, which I use for my students and is designated for children with writing difficulties, is an electronic dictionary, which is mainly helping the student to find the word and to write it correct. It is an important tool that can also be used by a student with dyslexia”*

Son uses software appropriate for students with reading difficulties. Its name is "Leno's land". *“It’s educational software that offers an incentive effect, support and inspiring learning environment of teaching reading and mathematics. Specifically, this software focuses on learning problems and difficulties that may arise in the school environment in the first and second grade of primary school. The ultimate purpose of the system is primarily the students’ development in cognitive and meta-cognitive skills in reading and mathematics;”* and continued with: *"Leno's land" has the ability to cover the following areas for students with reading difficulties; visual perception and discrimination, playing rhythm and perception of space and time, reading comprehension, vocabulary, phonological awareness, mnemonic skills recognition of letters and graph-phonemic correspondences”*

Son also uses the text editor which *“gives the possibility to the student to concentrate in small areas each time, for example keyboard, which is easier to remember. For students with more severe difficulties in writing, programs have been developed which are able to predict the word that will follow and they called "word bank". These programs become very useful as they help the student to express his thoughts without leaving gaps or half written words”*.

San uses a program that works with learning, spelling and writing skills. Such programs may be challenging for these children in order to practice and test their spelling. Moreover, computers in a multi-sensory learning environment are a very effective tool in combination with a program which includes reading, sound and writing. Typing a word is considered, also, a very useful practice, because firstly teaches students the movements of the fingers, which helps them to remember the correct spelling, and secondly helps the audio-graphic connection. (Samara, 2003)

### **Discussion on materials used in teaching pupils with reading and writing problem**

In this research, it is investigated how much teachers use materials such as computers, cards, games, pictures, applications. What came out during the interviews is that teachers are in desperate need of new technological material. There are many applications that support teaching students with reading and writing difficulties in English, but, unfortunately, they are not available in Greek. Teachers ask for more modern software. However, some materials, such as smart board or tablets, are available only in big schools due to the large amount of students. Nevertheless, there are few examples of small schools in villages, where even though the teachers have only the appropriate assistive technology, yet the schools are the most innovative public school in Greece.

One of the biggest advantages of the use of computers in classroom for children with reading and writing difficulties is their power to motivate learning. Very important is also the fact that the work with computers is a personal activity which reduces the student's exposure to criticism from their peers. Additionally, computers offer largely practice, because they don't get tired and can take more patience than a teacher, allowing students to learn on their own pace. Finally, computers provide students with learning difficulties what they need; work in small sequential steps. This strategy of segmentation in small steps has proven to be a successful way of teaching children with learning difficulties.

A very important factor that affects the proper use of the computer is the human presence. Firstly, teacher is the one who should plan and choose the work which students will do on the computer, help the student to understand the exercise that he has to do, explain the educational goal and reinforce learning with parallel work apart from the computer. Although work on the computer is more independent work, we must not forget that human praise and encouragement is more important for our students than the praise and encouragement from a machine. Computers can be very powerful tools in the teachers' hands when they are used with the right training objectives.

*Sin and San claimed that teachers can use many other activities on the computer which require cooperation between students with different skills, such as multimedia presentation*

*software, writing and reading in pairs. Collaborative approaches seem to help in including children with learning difficulties in the classroom. We have to think that children with difficulties should be accepted by their peers.*

The literature is enthusiastic for computers. One of the main arguments is that technology can release the student, make him more independent and autonomous, give him control over the learning process and reduce the need for the presence of the teacher. That is the process of learning which turns from passive to active ( Kelesidis, 1998). All teachers agreed that they want to use more technological devices, such as computers and tablets, because they attract students' attention and increase their commitment to work for creating opportunities in additional training (Underwood, 2000). Many participants in the current study described the barriers that they faced when they were trying to daily use the computer and some Greek applications for teaching reading and writing via computer. In one case, parents went to the school and demanded from the headmaster that the teacher would change the way of teaching their child, because they did not accept it as a method of teaching. All informants consider that computer is a powerful educational tool, a valuable assistant in all classes and for all students.

Sin and Sen agreed that the correct use of a computer for students with difficulties should provide a learning environment, where all dynamic senses are involved and so the lesson becomes more understandable and pleasant and gives impulses for further deep analysis. In addition, the use should allow each student or group of students to follow its own learning rhythm with no stress.

Son and San have mentioned also that good use of computers provides interaction and immediate feedback over the course of learning and it should give direct support to the student and strengthens the incentive for learning facilitates the development of critical thinking, active learning, enabling trial intervention and experimentation with learning material

However, teachers claimed that in the context of learning theories, they think that students with difficulties could facilitate better with educational software if that could base on more behavioral approach to knowledge through practice and training activities. Guided instruction, also on the constructive approach of knowledge, namely on Piaget, Bruner views, in a model-driven exploration and discovery through activities that promote critical and reflective

thinking, collaborative and participatory learning. The student gets knowledge by interacting through targeted activities with the environment (educational software), his classmates and the teacher who has the role of mentor and facilitator of the process.

Sen said:

*“...I think that as teachers we should follow the current educational technology. I searched for programs that I can use in the class and I found one program called Deep Freeze. This program allows the computer to return to its previous state and prevents negative interventions. Also, the program protects the operating system and helps avoid viruses. In this way, I can really protect the computer. Well, I think we can find some solutions to those problems”.*

Most of the participants-teachers supported the idea that teachers should use technologies for students good *“Technology is rapidly developing and as teachers it is obligatory to be broad-minded and to participate in activities and trainings that will help to develop our knowledge. For example, while we first used the smart whiteboard, we realized that it is very easy to do the most of the things. It was quite simple.”*

## **4.11 Extra discussion-Computers could make learning more productive**

For all above reasons that have been explained, it seems logical for some people to claim that learning process could be similarly automated. Additionally they claimed that teachers and students, who use computers as educational tools, they could reduce the time that it is needed for the teaching and learning process. Unfortunately, learning process is a process that needs time and it can yet not be automated. Until recently computer devices boost teaching and learning process with motivation and with exercises which aim was to check the previous knowledge and skills—computer is a tool that help a student to learn more efficiently.

Many studies in the literature (Detheridge, 1996) (McKeown, 2000) supports the results presented above, arguing that for students with difficulties in writing and reading computers

programs can be very useful and help the student to express more complete thoughts. Equally useful can be also and the text editors. Through the features of that programmes, one editor as Word the result is the student's work to be "clean" is, free of incomprehensible words and looking bad. It is organized and makes the student, to overcome a failure, as well as he makes him feel proud of his work (Crivelli V. , 2000) (McKeown, 2000)

Computers play a significant role in learning process. Learning is difficult process for students with reading and writing disability. Students work through computers in order to help themselves to develop, to achieve or to increase a capacity of reading and writing.

It's a truth that computers make things easier by helping students focus on what's important. The main point for teachers is to give parallel significant assistance through hard parts while students work on computer.

At this point it should be highlight that the computer should not be a machine which will replace the teacher. It is a device that works only supervisory with modern media, which offer praise and acknowledgment, and moreover change teachers' role by making them the transmitter of knowledge, coordinators and sponsors of the learning process. Computer, in no case can replace the teacher. Teacher plays and should play a central role in teaching process, especially at younger ages in primary education. Teachers can motivate students' imagination at early stages. While teachers use oral speech, they mobilize imagination and in the same time, the use of educational software can act additionally by stimulating students' senses. Moreover, multimedia compared with conventional teaching aids, such as video, audio, etc., offer something more efficient to students. The student is not watching the process passively. That means that student is not only a passive viewer, but also he participates and acts by his own initiatives.

## **4.12 Chapter summary**

Computers offer tremendous potential for helping students with writing and reading problems. But to make it happen, there needs to be an effective cooperation between parents, teachers and state. It is absolutely necessary to have right conditions so as to meet the individual needs



of students with difficulties. It was found necessary to make major changes in both programs trained, and the software used. This is an essential prerequisite in order to have effective integration of children with difficulties. Also one of the major issues which revealed by this analysis is that teachers should get the appropriate training and education in order to understand, trust and apply what is offered by new technologies for training students with difficulties in writing and reading. Finally, it is important to note how great is the importance of the State and the respective bodies of which the corresponding support is required.

# 5 Summary and Conclusion

## 5.1 How educators deal with Difficulties

From the findings deriving from the research, it is easy to understand that teachers do employ a plethora of strategies, in order to meet individual needs of all the students in their class in order to help them to learn. Participants claimed that those students should have extra help in order to accomplish the activities given to them receiving parallel support. Unfortunately, not each school has a special educator because it cost and as I have already said the state does not give extra funding in education. The teachers who participated in the research claimed that they use assistive and instructional technology, like computers, to help students with reading and writing difficulties in the classroom. . The results revealed that some the informants could not give the correct definition of the concept. This result indicates the lack of reliable information and the gaps in teacher training on the subject under consideration. It is revealed that teachers in Greece have poor knowledge of the term “reading and writing difficulties”. This is a serious problem that requires solve, especially if we consider that in Greece students with learning difficulties constitute at least half of the population of special education. (Panteliadu, 2004) It is important to be note however, that the problem relates to the lack of knowledge regarding the term learning difficulties seems to be general, since although many studies have dealt with this issue, few studies were done to clarify what teachers both in primary and secondary education really mean, when using the term. Uncertainty is exacerbated as research has shown that when teachers are asked to think about a particular child with learning difficulties, their give a wide range of behaviours. This problem should be solved immediately as it affects teachers’ performance and therefore the educational process’s performance.

Unfortunately, there are no teacher assistants in the classrooms who can help students with the given activities during the lesson. There is only one teacher who co-operates with minimum 27 students. Many teachers ask students to help one each other, so that they can assist those who struggle. That happened for two reasons 1. Selv-evaluation and 2.lack of assistants. That creates a class for all and it also enables students to ask for help when needed. This strategy inspires freedom of expression. This way the teacher creates a kind of inclusive class. This

interaction/co-operation encourages the teaching and learning process, creates relations between classmates and most importantly it avoids marginalization of students with difficulties. All the participants are willing to create appropriate environment for students with reading and writing difficulties. Many teachers create software in Greek and ask for help in order to cope with that task. This enables students with difficulties to work on the same activity simultaneously with the peers, which according to 'Vygotsky' theory is beneficial.

## **5.2 Factors affecting the proper use of computers and it's software/ Problems of teaching students with reading and writing difficulties**

The second question of the study was concerned to the problems that teachers face, when teaching students with reading and writing difficulties. The results revealed that while the importance of new technologies in education students with learning difficulties is recognized, however there are serious problems / barriers to the application of technology in the learning process. The problems relate to inadequate equipment, lack of training materials for students with learning difficulties, as well as lack of support from the state, since the financing of new technologies in schools is limited.

In generally, in Greece, the importance of new technologies for creating a qualitative education, it is not yet well accepted. The integration of computer in education classroom is moving slowly despite the generous efforts of teachers. This anachronistic phenomenon is in contrast with the prevailing conditions in other technological developed countries. Primary education is the bases for all kinds of learning skills; in other words students build the fundamental knowledge, attitudes and experiences during those stages. Therefore, the dynamic integration of information technology and primary education, both in the form of adequate technical equipment as and the design of similar learning activities, is something more than necessary. In summary, the introduction and integration of technology in education is a priority of today's society. The modern development of educational system cannot be

understood without the implementation of new technologies, without computing and various applications in the «information society».

There are many applications that support teaching students with reading and writing difficulties in English, but, unfortunately, they are not available in Greek. Teachers ask for more modern software. Nevertheless, there are few examples of small schools in villages, where even though the teachers have only the appropriate assistive technology, yet the school is the most innovative public school in Greece.

These are serious obstacles to the comprehensive use of multiple benefits of new technologies for teaching students with learning disabilities. Additionally these obstacles are believed to affect the overall efficiency of the education process and therefore require immediate resolution. The state is necessary to pay more attention to these problems, as it was demonstrated by the present research and other similar (Spyropulu, Kontaris, & Antonakaki, 2008) funding in schools by the state is insufficient.

### **5.3 Effectiveness of computers to deal with reading and writing difficulties**

The third question of the study examines the degree of effectiveness of teachers and new technologies for teaching students with reading and writing difficulties.

According to the results of the study, new technology and especially computers play a significant role in learning process. It is important to note that as it is already understood by the present study, learning is a difficult process for students with reading and writing difficulties. Students work through computers in order to help themselves to develop, to achieve or to increase a capacity of reading and writing. It's a truth that computers make things easier by helping students focus on what's important. The main point for teachers is to give parallel significant assistance through hard parts while students work on computer and for achieving this, the training of the teachers is very important.

At this point it should be highlight that the computer should not be a machine which will replace the teacher. It is a device that works only supervisory with modern media, which offer praise and acknowledgment, and moreover change teachers' role by making them the

transmitter of knowledge, coordinators and sponsors of the learning process. Computer, in no case can replace the teacher. Teacher plays and should play a central role in teaching process, especially at younger ages in primary education. Teachers can motivate students' imagination at early stages. While teachers use oral speech, they mobilize imagination and in the same time, the use of educational software can act additionally by stimulating students' senses. Moreover, multimedia compared with conventional teaching aids, such as video, audio, etc., offer something more efficient to students. The student is not watching the process passively. That means that student is not only a passive viewer, but also he participates and acts by his own initiatives.

The study revealed that teachers emphasizes on students motivations. This result agrees with the views of other researchers (Crompton & Mann, 1996) according to whom one of the biggest advantages of the use of computers in classroom for children with reading and writing difficulties is their power to motivate learning. Very important is also the fact that the work with computers is a personal activity which reduces the student's exposure to criticism from their peers. Additionally, computers offer largely practice, because they don't get tired and can take more patience than a teacher, allowing students to learn on their own pace. Finally, computers provide students with learning difficulties what they need; work in small sequential steps. This strategy of segmentation in small steps has proven to be a successful way of teaching children with learning difficulties.

A very important factor that affects the proper use of the computer is the human presence. Firstly, teacher is the one who should plan and choose the work which students will do on the computer, help the student to understand the exercise that he has to do, explain the educational goal and reinforce learning with parallel work apart from the computer. Although work on the computer is more independent work, we must not forget that human praise and encouragement is more important for our students than the praise and encouragement from a machine. Computers can be very powerful tools in the teachers' hands when they are used with the right training objectives.

In generally, the literature is enthusiastic for computers. One of the main arguments is that technology can release the student, make him more independent and autonomous, give him control over the learning process and reduce the need for the presence of the teacher. That is the process of learning which turns from passive to active (Kelesidis, 1998). All teachers in the present research agree that they want to use more technological devices, such as

computers and tablets, because they attract students' attention and increase their commitment to work for creating opportunities in additional training (Underwood, 2000).

Conclusively, all participants consider that computer is a powerful educational tool, a valuable assistant in all classes and for all students. They all agree that the correct use of a computer for students with difficulties could be very efficiency because of lot of factors. For example, computers provide a learning environment where all dynamic senses are involved and so the lesson becomes more understandable and pleasant and gives impulses for further deep analysis. Also computers have unlimited patience and the students is not ashamed nor afraid to communicate, while moreover computers allow each student or group of students to follow its own learning rhythm with no stress, as well as to interaction and provides immediate feedback over the course of learning. Finally computers give direct support to the student and strengthen the incentive for learning and facilitate the development of critical thinking, active learning, enabling trial intervention and experimentation with learning material.

## **5.4 Methods and practices for teaching students with reading and writing difficulties**

In general, computer use should be based and focused on the individual needs each student has. It is confirmed, through literature, that computer is a great tool for showing praise and reward to students with difficulties (Protopappas, Skaloubakas, Nikolopoulos, Arxonti, & Triantafullakos, 2000). Working with computers requires much more independent work and teachers have to keep in mind that student's praise is concerned to be one of the most important features for students. In the first phase, the teacher is the person who designs and selects the work, which the students should do on the computer. He also helps the student to understand the activity, explains the educational aim and, at the same time, improves learning with additional activities.

It should be emphasized that the use of computers without teachers' contribution to teaching process could not be possible. Computers may become very powerful tools in educators' hands if applied with the right educational goals (Glezou, 2002) . However, according

to participants, the use of computer has disadvantages that should be highlighted so as to avoid the one side use and to promote the use of multi sensory methods. Computer should not be classified as panacea to solve learning difficulties. When teachers are not educated enough, they use computer in bad way. (Samara, 2003) We should also have in mind that a computer device functions with electricity and internet and in case of any problem, their proper use is affected.

Additionally, the use of the computer covers a human need, which is particularly increased in students with difficulties; this substitutes in no case the teacher's contribution. Furthermore, the software and the incapability to promote any learning process can be considered as some of the main disadvantages. There is need for both constant information and monitoring by the teacher of developments in the field of education software and the need to first test the tools and the relative applications before they come to the market (Samara, 2003). According to the research, problems have been identified and there has been some process to assess the effectiveness of the programs and to evaluate whether progress is made and goals were achieved (Samara, 2003).

## **5.5 Teachers' Recommendations**

There have been recommendations on behalf of the teachers, who highlighted that they wanted their suggestions regarding the inclusion of all learners in ordinary classes to be published and notified to the teachers' society. Teachers should know how to teach language and should have phonological awareness as students begin to learn how to read. In most of the Greek universities, teachers are only taught how to teach mathematics and physics. Teachers need extra help in order to understand at early stages that something goes wrong with certain students. Teachers should utilize multi-sensory teaching methods, which incorporate all the approaches, and should employ them during the lesson, in order to reach all learners' diverse needs within the classroom, so as to promote inclusion. It is important for the teachers to be able to identify early enough learners who struggle with reading and writing. Each student is different from the others, although they may have many common difficulties, which need to be acknowledged in the teaching process. Individual differences may be identified through learning styles and strategies.

Many teachers, who work with students with reading and writing difficulties, have used books and software in order to improve their students learning to read skills and this has raised their self-esteem. This research has led to questions about whether teachers are experienced and know how to use technological staff in order to help students with reading and writing problems. This leads to questions about how well educated the teachers are and how they treat students with disabilities. After the interviews, I had to investigate whether it was given or not information and guidance from the state and the ministry of education to the teachers. The research has also shown a desperate need for more guidance and scheduled provision of educational software. The need of having appropriate educational staff has been highlighted, in order to include all students in the educational process. It has also exposed the need for a fundamental change in the way the state deals with the situation at schools, in the social policy and the benefits it provides to each school and teacher, as well as in values and attitudes. Efforts need to be made by institutions and individuals. In addition, the research has revealed the need for truly support services. This will also help to change attitudes, values and beliefs of who seems to be greatly influenced by each government. Technology can help students with learning difficulties, but that does not make instructions superfluous. Students with writing difficulties need special attention and methods of help. Most teachers believe that a combination of good use of computers, internet and educational software could be helpful in order to teach their students handwriting and helping them with spelling with simultaneous praise and encouragement.

## **5.6 Conclusion**

The present study's findings show that teachers are willing to use technology in their courses for teaching reading and writing. In related literature, studies reveal that teachers are willing to use technology in their courses when technology is organized according to the curriculum (Samara, 2003). Moreover, the interaction between teachers and students can be increased with the help of technology. This is also supported from other researchers (Karasavvidis, Pieters, & Plomp, 2003) (Muir-Herzig, 2004)

However, it is an obvious fact that teachers need support regarding technology use in their courses. The limited number of technological support (tablets) at schools or the low finance capacity makes it difficult to be used at schools. Therefore, teachers cannot efficiently use technology in their courses. There is little research in Greece on how to use new technologies



and software helping students with reading and writing difficulties. This study shows some of the limitations and barriers of the country school system. It shows how non flexible the system is and to what extend the state cooperates with the teachers. That should change. In Greece, educational system functions more with intergraded classes rather than inclusive ones. Inclusive classes in Greece are at a very early stage and some teachers still remove students with reading and writing difficulties from their classes in order to give them extra help.

However, all of the teachers agreed that inclusion has to be implemented soon in order to be beneficial for all students. Although inclusive education has great advantages, it is clear that there are many challenges during its implementation. Having inclusive classes does not mean closing down special schools and placing students with difficulties and disabilities in the mainstream system. Inclusion requires special and innovative practices and technological devices. Inclusive practices require better finance and at this moment Greek state cannot offer any more help.

More funds should be given to researchers in order to design appropriate software in Greek language. More research needs to be done to examine teachers' opinions and practices. Barriers and limitations do exist, but in order to fix a situation, should first be thoroughly examined. The fact is that technology and computers have great potential to help us to educate children with all types of learning needs. But these possibilities may remain a mere prospect if the entire education system does not create the right conditions to apply different and creative solutions consistent with the needs of our students. The first thing required is a more open and flexible school curriculum. Such a program is necessary not only for the deeper integration of children with learning difficulties in class, but also for the effective introduction of computers in daily lesson. Secondly, the teachers should be trained on using computers in everyday school life. Both these important steps in conjunction with the design programs according to the needs of children with difficulties can give us more effective ways to help this particular group of students. It is clear from the research that the educational system in Greece has to adapt some innovative changes in order to follow the European educational standards. Each educator's and school's practices should be evaluated. Teachers should implement their teaching with well-structured work so as to give opportunities to all students. One of the roles of the modern school is to treat all students equally and offer a high quality education in order for them to achieve all their individual goals.

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# Appendices

## Appendix A

The term “ensomatosis” is the Greek translation of the integration. The idea of “ensomatosis” is expressed by the term “integration” in England, “mainstreaming” in the USA and “normalization” in Scandinavia. (Zoniou-Sideri, 2004) The term “integration” derives from the Latin verb integrate which means to complete. According to the Greek dictionary (Tegopoulos & Fytrakis), the term “ensomatosis” means to unite as one body. It is used to describe an intentional placement so as to become an inextricable part of a greater whole (Babinotis, 1998). During the process of “ensomatosis”, the original characteristics of the individual are not preserved, but rather assimilated by a greater whole.

## Appendix B

Requesting you to participate in my study

Dear teacher,

My name is Nikoleta Anagnostou. I live in Norway but i come from Athens, Greece. I am a teacher in primary level. Currently, I am a student at the University of Oslo, doing my master in Special Needs Education. The purpose of my study is to investigate how teachers use computers to teach students with reading and writing difficulties. For that reason, I would like to interview teachers. My interest will be on how teachers use computer technology. The interview may last half an hour. The interview will be recorded and I will take notes to enable me pick all important details. No one, except me will have access to the information you will give me. Nobody will be able to recognize you in the report at any time. I will erase and delete all personal data as soon as I finish my thesis in 2015.

Participation in this research project is voluntary, and I have to mention that you can stop participating if you want to, whenever you want. However, I would personally appreciate your participation very much. I have a lot of interest in teaching via computer technology students with difficulties in the area of reading and writing. By participating in this study, you will contribute to finding answers and recommendation for using more computer technology



in public schools in Greece. If you have any questions, you are most welcome to contact me at any time. Your participation in this study will be highly appreciated!

Yours sincerely, Nikoleta Anagnostou

## **Appendix C**

### Application Form

I have received oral and written information about the study and i would like to participate. I am also aware of my right to withdraw from this interview or to refuse to be observed at any time I feel like without having to give any reason. I have also been assured that whatever I say will not publish.

Full name of the participating

Teacher: .....

Signature: .....

Date: .....

Phone number: .....

## **Appendix D**

### Interview Guide

Do the teachers use computers during teaching process of reading and writing? Or they don't. Why teachers and schools don't use electronic devices? Is it because of the cost that the state cannot afford? Or that they do not know how to use them?

What teachers believe about reading and writing difficulties? What are they? Are children getting rid of them?

Do the teachers have access to the internet connection?

Do they have access to any other devices like smart board, lap top, audio recorders? Do they use computer in the class?

Do they have experience of how to use it?

## Appendix E

### Figures

Figure 1.

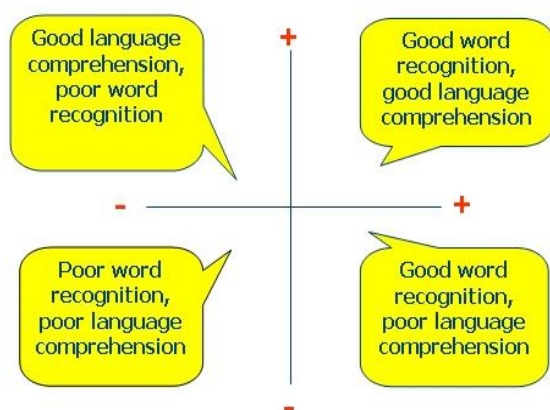


Figure 2: Information for informants

Participants	Specialty	Years of Experience	Model of interview
Sin	Primary Teacher and Psychologist	7	Face to face
Son	Primary teacher, Student at master of Special Needs Education in Athens	5*Experimental School	Face to face
San	Primary Teacher, Integrated class	25	Face to Face
Sen	Primary teacher, Special Needs Educator	15	Via email

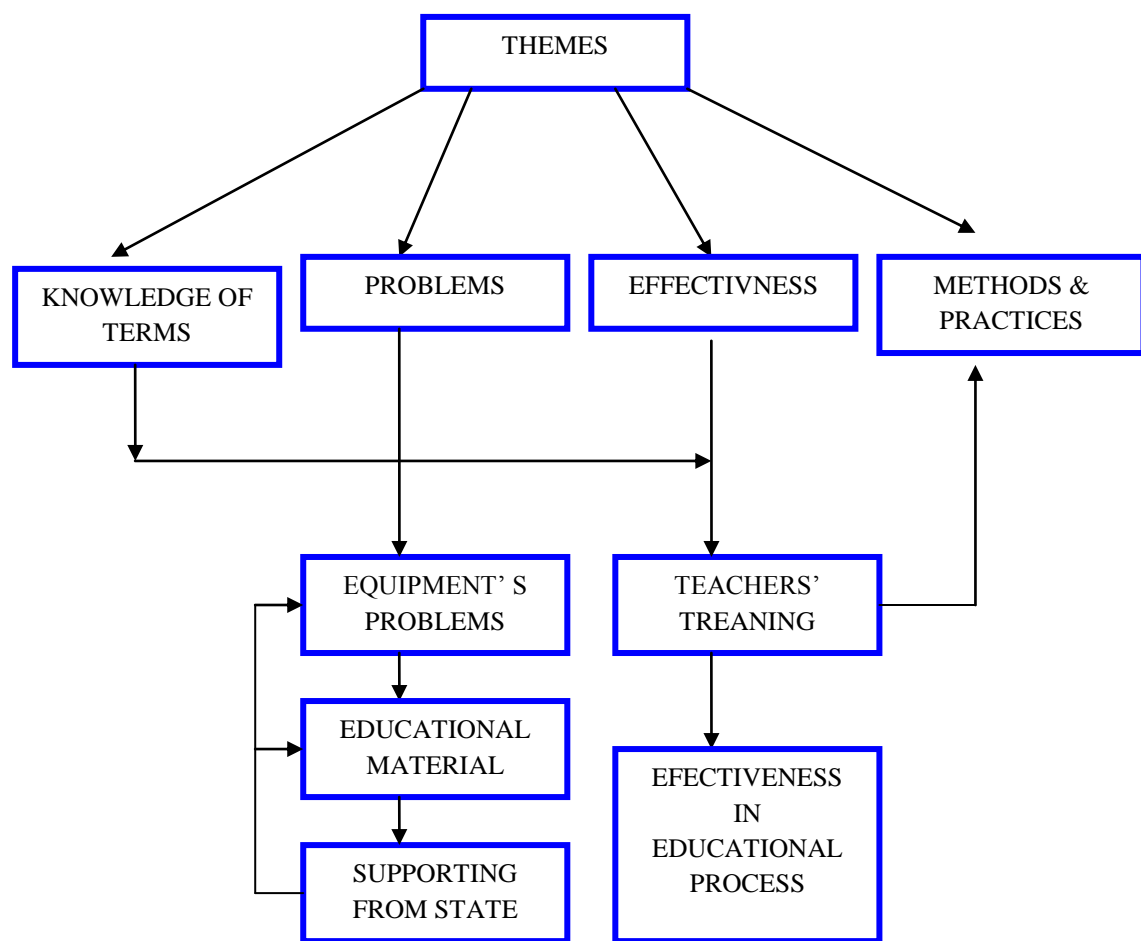


Figure 3